THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. X. No 215—13th YEAR.] LONDON, JANUARY 15, 1861. [Subscription per Ann. { 15s. in Advance / 18s Credit.] Price 8d. Unstamped.

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By Order,
JOSEPH HERON, Town Clerk.
Gas Offices, King Street, Jan. 9, 1861.

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The lowest or any Tender not necessarily accepted.

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J. CHURCHILL, Secretary.

Walsall, Nov. 6, 1860.

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By Order,
JOSEPH BRADDOCK, Clerk.

York, Jan. 10, 1860.

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Dorchester, Jan 10, 1861.

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CONTENTS.

Leading Articles:— PAGE
Notes upon Passing Events 27
Death of Samuel Clegg 30
Circular to Gas Companies 31
Correspondence:—
Gas and Water in Valparaiso 32
Supply of Gas by Meter to Public Lamps 32
Register of New Patents:—
Jones, H.—Improvements in Water-Closets 32
Higginbottom, W.—Improvements in Pipe-Joints and Valves . . . 33
Binks, C.—Improvements in Manufacturing Oxygen Gas 33
Laming, R., and Smith, C.—Improvements in Purifying Gas . . . 33
Richardson, T.—Improvements in Purifying Gas 34
Durand, F.—Mode of Purifying the Thames 34
Krotkoff, S.—Improvements in Apparatus for Employing the Electric Light 34
Standly, H. J.—Improvements in the Production of Gases 34
Biedermann, E.—Improvements in Apparatus for the Measurement of Gas, &c. 34
Leslie, J.—Improvements in the Manufacture of Gas 34
Provisional Protections 34
Notices to Proceed 35
Legal Intelligence:—
Vice-Chancellor's Court.—Harper *v.* Pearson 35
Miscellaneous News:—
Upward's Tapping-Drill 36
Meeting of the Surrey Consumers Gas Company 36
Description of a "Gas-Prover," or Instrument for Ascertaining the Quality of Gas 41
Failure in the Supply of Gas at Halifax 42
Detection of Bisulphide of Carbon in Coal Gas 42
Southborough Gas-Works 42
Report on the Gas of the Surrey Company 42
Annual Meeting of the Bilston Gas Company 42
The British Coal Trade 42
The Scotch Pig-Iron Trade 42
Main Drainage Works 43
Price Current 43

TO CORRESPONDENTS.

A Subscriber.—*We are not aware that excessive cold can produce the effect you mention, and should be inclined to look for the cause in some defect in the valves connected with the purifiers.*

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The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, Jan. 29, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This Journal has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JANUARY 15, 1861.

NOTES UPON PASSING EVENTS.

The importance of our Australian Colonies, as producers of wool and gold, consumers of manufactures, and employers of emigrant labour, is a sufficient reason for condensing, from additional sources, a more complete account of the many public reproductive works in progress, than that given in our last "Notes." South Australia, whose prosperity was founded on one copper mine, the most profitable and productive in the world, has not yet been favoured by the discovery of any important gold-fields, or, indeed, of any remarkable copper mines, except the famous Burra-Burra—the one prize drawn first, and succeeded by more than one hundred blanks. But South Australia has from the first been distinguished by a more educated and intellectual class of colonists than its more wealthy and fortunate sisters; and this intellect and education bore good fruits, when a few years of misfortune had taken the conceit out of the raw Settlers, who thought that book-learning alone would compensate for the total want of colonizing experience. For several years, the South Australians have been paying sedulous attention to opening and keeping up useful roads through their province, and they supplemented land communication by placing steamers of a peculiar construction on the two hundred miles of the shallow, winding river Murray—the first steamers that ever plied on the inland waters of Australia. This river Murray formed a prominent feature in the delusive maps of the land-sharks of the first Australian Company, and was compared to the Danube and Mississippi, but it has only been rendered navigable for steamers drawing from twenty to twenty-four inches of water, by great ingenuity in mechanical arrangements, and by great labour in removing bars and other obstacles. It is still closed to the sea; but the result has been not only cheap conveyance for the exports and imports of the South Australian squatters, but a good trade in supplying the colonists of New South Wales with stores from Port Adelaide. In New South Wales, the roads, with many other works, were, until recently, under the charge of a military man; and, as often happens in such cases, his time was so much taken up with desk-work, that the roads fell into ruin, or were repaired in the worst possible manner. The colonists ought to have found out by this time, that a plain, practical engineer, with full authority, one ready to pass his life in the saddle on the roads, would be a cheap addition to the Office of Public Works. As it is, the old colony of New South Wales is losing part of its trade, because the South Australians can supply the squatters with conveyance cheaper from Adelaide than from Sydney.

But the South Australians are contemplating a work even more important than the navigation of the river Murray. The Legislature has framed a scheme for introducing the system of irrigation, which works so profitably in Lombardy and in India. A bill has been introduced which will enable the Governor to proclaim districts for the purposes of irrigation, on the petition of a certain number of settlers; to constitute elected irrigation boards in those districts, with authority to make bye-laws, and to superintend the construction of, and to control the management of works, and to levy rates for the maintenance of the irrigation works. The great difficulty of the Australian Colonies is not the absolute want of rain—the average over a series of years is often satisfactory. But crops cannot be grown by averages any more than people can be fed by them. The defect is, that the Australian rains come altogether in bucketfuls instead of gentle streams, and frequently, from the contour of the country, flow away as fast as they fall. These irrigation boards will endeavour to husband the precious fertilizing article, and thus render possible the profitable cultivation of crops hitherto unknown. A similar measure is understood to be in preparation by the Government of Tasmania, which has the advantage of many perpetual streams flowing from its mountains, not navigable, but admirably adapted for irrigating purposes, if funds can be found for the purpose of executing works quite out of the reach of the means of private individuals. The average rainfall of New South Wales is in excess of that of Great Britain. Some of the wealthy settlers in that colony are also contemplating irrigation works on a large scale on their extensive properties; but the *Sydney Morning Herald* wisely counsels the smaller agriculturists of New South Wales to imitate the South Australians, and obtain authority to form boards for districts, with powers to raise loans on security of the water rates. If this be done, we shall not hear of the scarcity and high price of vegetables under one of the finest climates in the world. Land improvement has been very much facilitated in South Australia by the adoption of a simple, safe, and cheap system of land transfer, and by the formation of agricultural municipalities.

In New South Wales, the people are beginning to find out what they were too proud to believe a few years ago, although warned by competent authorities—*i. e.*, that Australia contains too much poor land, and is, and always must be, too thinly populated to execute or maintain a network of railroads on the European plan. To meet this difficulty, the Governor, Sir William Denison—or, rather, we should say the late Governor, for he is appointed to Madras, to succeed that model

blue-book maker, Sir Charles Trevelyan—has devised a plan of horse railroads to supplement the locomotive railroads now in course of execution. The Minister of Works has asked the New South Wales Parliament to appropriate four millions sterling for executing 1220 miles of railway, to be completed in two years. The following are the lines, which can be traced on any recent map of New South Wales:—Extension from Singleton to Tenterfield, about 308 miles, £924,000; from Mudgee to Northern line, about 142 miles, £426,000; from Mudgee to Wellington, about 50 miles, £150,000; from Tenterfield to Grafton, about 115 miles, £345,000; from Blacktown to Windsor and Richmond, about 17 miles, £51,000; from Penrith to Wellington, about 175 miles, £525,000; from Picton to Albury, about 326 miles, £978,000; from Eden to Cooma, about 85 miles, £255,000; towards improvement of mountain passes, and construction of bridges, £146,000; rolling stock, £200,000—total, £4,000,000. It is said in the colony that the present roads will be for the most part used without any attempt to reduce the gradients to what are considered working proportions, but we should doubt this. There must be enough engineering science in the colony (the Governor was originally an officer of engineers) to know that beyond certain gradients the rail will be rather a loss than a gain. The cost has been roughly estimated at £3000 a mile, and it is to be presumed that the works are intended to be available for the ordinary two-wheeled drays of the country.

This rough and ready expedient does not meet with the approval of the Government or of the civil engineers resident in the colony. They are sure to despise a rough and ready makeshift from which neither profit, nor glory is to be obtained. But it is not the less worthy of candid consideration. It has the advantage of being within the means of the colony, and also of being of immediate use to those localities where physical obstacles do not present insurmountable difficulties to a tramway. The assistance of civil engineers of a high class is indispensable, where great works are contemplated or to be executed. But a pastoral county cannot afford the "*plant*" of a densely-populated manufacturing county, or even a country like the United States, intersected by great navigable rivers and dotted over with important towns. A country curate might as well write to Long Acre, and order a sledge to travel over snow-choked lanes, instead of going to the nearest blacksmith, and getting him to put a chair or an old gig body on a couple of iron runners. There are, of course, circumstances under which it is really more economical to employ a first-rate carriage builder and pay him his price for a first-rate, durable article; but then it is also wise under other circumstances to make shift with something which, although not the best, is good enough for the time and the customer.

Mr. Bidder, who is as shrewd a financier as most men, made an observation, when discussing the construction of the Victoria Docks, well worth the consideration of colonists. He said, "I did not design these works in the manner I should have adopted, if ample funds had been at my disposal; but the problem I had to solve was, how to provide a large water space with a limited sum of money?" Now the Australians, a few years ago, thought that the discovery of their gold-fields had given them inexhaustible wealth, and nothing but the best of everything, or at any rate the most expensive, would serve them. "Now," says the Sydney paper, "there is a very general conviction that some sweeping change in our railway policy is inevitable, not only from the expensiveness and unproductiveness of the existing lines, but from the tedious delays attending the construction of those now in progress." In a word, the colonists want to cover as much land with as many roads for as little money as possible. Speed is not required in Australia; five or six miles an hour would be amply fast enough for goods traffic; and there is not a single town of ten thousand inhabitants off the coast to supply passengers. It appears that "the works contracted for by Sir Morton Peto and Co." are not proceeding at the rapid rate that was anticipated, in consequence of disputes between the contractors and the Board of Works. "The only new Railroad extension to be proposed this session (October, 1860) is from Maitland to Morpeth, five miles, estimated to cost £20,000—the character of the country being level, and the greater portion of the land offered free to the Government. A branch line, three miles and a half in length, is nearly complete from the mines of the Wall's-End Coal Mining Company to the Great Northern Railway Waratah 'Station,' which will convey coal direct to the Port of Newcastle."

The progress of the telegraph in Australia is very remarkable. No time seems to have been lost in imitating the system which India owes to Dr. O'Shaughnessy and the late Earl Dalhousie. In New South Wales alone, 1000 miles of telegraphic wires are open, and worked in connexion with a money-order system with great success. "Extensions have been contracted for, amounting altogether to about 800 miles, consisting of about 400 to the northward, 300 to the southward, and 100 to the westward, and will be completed within from three to twelve months," from October last. The completion of the northern line will put the new colony of Queen's Land, formerly known as Moreton Bay, in communication with Sydney, Melbourne, and Adelaide. Sydney was connected in October last with Kiandra, the chief town of the principal N.S.W. gold-field, which has a population equal to that of any town in the colony, except Sydney. Two telegraphic extensions were proposed in the last session of the Colonial Parliament—from Goulburn to Braidwood, and for a line from Denlequine to the eastward boundary of South Australia. These will give three lines of telegraph between Sydney and Adelaide. In 1858, the number of messages in New South Wales was 9000; in 1859, 36,000; in the first half year of 1860, 25,000. In 1859, they paid the Government interest at the rate of 13½ per cent.; in 1860, 11 per cent. In the province of Victoria, the youngest and wealthiest of the three, money is being expended, and proposed to be expended, on public works, with a liberality quite astounding, considering the limited extent of the population.

A Melbourne newspaper contains a description of a plan for supplying the gold-mining districts of Castlemaine and Sandhurst with water. A Mr. Hall, engineer in charge of the Taradale section of the government railway, proposes to avail himself of the railway works, and especially of a railway tunnel, to obtain the large supply of water required by the miners from Taradale through Castlemaine to Bendigo Valley. "Taking advantage of the railroad works to dam up the river Coliban near Taradale, and form at the insignificant expense of £27,000 a reservoir covering 250 acres, which would receive the supplies of a water-shed of 100 square miles, and be capable of supplying 10,000,000 gallons per day of ten working hours." "The level of this proposed reservoir is 1450 feet above the sea, or about double the height of the Castlemaine and Sandhurst. Thus the whole length may be supplied by gravitation." The distance from Taradale to Sandhurst is about forty miles—nearly the same as from Loch Katrine to Glasgow; and "it is proposed to take advantage of the tunnel through Big Hill now pierced—a work without which the scheme would be impossible—and carry the water by large pipes along the line of railway." This sounds well, and, if executed, will be a glorious work for a colony barely twenty years old. The railroad works on which its execution rests seem progressing, for the same paper states, that "on the Murray River line, the heavy works immediately beyond Sunbury, the high flat-topped viaduct over Jackson's Creek, and the extensive cutting beyond, are rapidly approaching completion, while the permanent way is in such a state of forwardness that toward the end of January, 1861, "the opening of the line twenty-eight miles from Sunbury, and fifty miles from Melbourne will take place." Between Woodend and Castlemaine (this was in October last) are, amongst other heavy works, the Coliban Viaduct, a structure of five openings, each of 60 feet span; and the Taradale viaduct of five arches of 120 feet high, and of 100 feet span. The main arch of the Coliban viaduct was to be keyed, and the foundation of the other viaduct laid with the usual ceremonies a day or two after the despatch of the summary from which we quote. The colonists are also congratulating themselves on the discovery and invention of a substitute for the Roman cement hitherto imported from the mother country.

In reference to the above-described railway, we learn that "the Malmesbury quarries, extending over four square miles of ground, contained a quarter of a million of dressed ashlar" for the piers of the viaduct "on which iron girders are to rest." The contract time for completing the line from the port of Geelong to the mining district of Ballarat, will expire in July 1861. The greater portion of the earthworks are already completed; a viaduct over the valley of Moorabool, 1500 feet in length and 100 feet high, was being pushed forward vigorously, and the girders, in 120-feet spans, were on their way out. We have already expressed our doubts of the prudence of these magnificent engineering monuments; but in reading

of them it is impossible not to feel proud of the energy of the English speaking race when contrasting its works with the feeble colonizing efforts of every other nation. Mention is made of "a novel appliance, tried with great success, for breaking stones for ballasting the railway, lately introduced from America—a gigantic pair of nutcrackers, worked by a steam-engine, and having vertical corrugations on the breaking faces. Several of these machines are being made, and some are actually at work, turning out large quantities of ballast of first-rate quality. When it is considered that the quantity of stone yet to be broken for ballasting the two lines of railway now being constructed is about 1,000,000 cubic yards, the value of this invention may be appreciated."

Williamstown, the port of Melbourne, is being improved by a breakwater and other works for enabling ships to discharge alongside, instead of with lighters. The pier is already so far advanced that nearly 100 vessels, of from 200 to 2000 tons burden were berthed alongside it during the first six months of 1860. The short line connecting Melbourne with Hobson's Bay, appears to have earned from goods and merchandise upwards of £5000 in the month of August. We cannot discover that any of the other four lines earned a dividend. But of course a very small dividend, when the system is complete, would repay the colony indirectly. We conclude our bird's-eye view of colonial enterprise by a few extracts from an article entitled "Victoria in Figures."

The Board of Science costs the province of Victoria £1000 per annum; the Government geologist, £1400, and travelling expenses; a public library, £1000, in salaries; a palæontologist, £300 a year; Magnetic Survey Department, £1300; "Botany, Zoology, and an experimental farm are well provided for." The Marine Survey is set down at £4000 a year. A commissioner, at £1060 a year, looks after the roads; a chief architect gets £1000, and a clerk of the works £1200, for superintending the building of the Houses of Parliament. The Mining Department, the supervision of railways, the telegraphs, light-houses and light-ships, sewerage and water supply, employ an army of officials, at salaries of from £100 to £1000 a year. Altogether, Victoria seems in a fair way of being devoured by office-holders, if the revenue should ever fall short. On the gold-fields are 503 steam-engines, 6400 puddling machines, and 144 quartz-crushing machines. In course of construction are Houses of Parliament, to cost £400,000; a custom-house, £100,000; treasury, £85,000; post-office, £96,000; additions to lunatic asylums, £66,000; a museum of building materials, £4000. £25,000 has been spent on wharves and harbour improvements; £42,000 on dredging the river Yarra and Geelong Bar; £60,000 on a patent slip at Williamstown; £29,000 on a Government printing-office; £65,000 on police buildings; £340,000 on gaols; £140,000 on penal establishments; £24,000 on light-houses!

The prospects of South Australia have recently been materially advanced by Mr. Stuart's discovery of a fine pastoral country to the northward. It formed the subject of an interesting communication to the Royal Geographical Society on Monday last. This and other recent discoveries seem to dispel the fixed idea of our principal geographers, that Australia is of the form of a soup-plate, bordered at some distance from the coast by a range of hills, and sinking in the interior into a hollow desert, thinly covered with water during rainy seasons, but usually sandy, and uninhabited by either beast or bird.

The *Times*, in reference to Mr. S. Stuart's successful journeys, reproaches this country with exhausting its funds on African explorations, and neglecting Australia. The reproach is, we think, unfounded. If funds were found here, the explorers, zealous and ignorant of bush life, would be found here, too. The first explorations of the old Peninsular officer, Sir Thomas Mitchell, were failures until he acquired colonial experience; then he became "The Cook of Inland Exploration." Captain, afterwards Sir George, Grey's expedition failed miserably; so did Mr. Eyre's, and only resulted in showing the pluck of the two explorers, and making them both Governors of colonies. They failed from the want of bush habits. Poor Leichardt, so shamefully deserted by the colonists, qualified himself before setting out on his first expedition by a regular apprenticeship to bush life. All the greatest discoveries of land have been pioneered by the squatters seeking grass and water for their flocks and herds. These two expeditions of Mr. Stuart have been fitted out chiefly at the cost of a South Australian colonist, a Mr. Chambers; and, as there are many wealthy colonists, and few means of wisely or pleasantly spending a large income in Australia, exploration will be best left in colonial hands, with such honorary encouragement as the Home Government can give to the brave adventurers and the liberal subscribers. If a practicable road can be established across the Australian continent, and a colony successfully founded on the Gulf of Carpenteria, then, with the help of telegraphs, railroads, wells, water-works, and irrigating works, India and Australia may become commercially connected, and even long lines of railroad will find produce to convey. After the geographical questions are settled, further successful colonization will chiefly depend on engineering questions—viz., water and conveyance.

Three Bills for authorizing the laying down of Railways or Tramways on common roads are now before us. The Metropolitan Transit Company state in their preamble that "the passenger traffic of the metropolis might be, with great efficiency and accommodation to the public, conducted by means of carriages drawn along tramways laid down upon the principal public thoroughfares." The Act contains no compulsory powers, but simply authorizes the Vestries, or District Boards, or the trustees of any turnpike-road within the metropolis, to grant, by resolution, permission to the company to lay down tramways on public thoroughfares; and where one parish agrees, and another adjoining parish disagrees, that the final decision is to rest with the Metropolitan Board of Works. Tramways not to be laid down on land not dedicated to public use, without the consent of the owners and occupiers. Penalties of £5 are imposed on parties wilfully obstructing the setting out or making of a tramway which has been duly authorized, and £10 on parties obstructing the working of tramways. Disputes between the company and any vestry, board, company, commissioners, or persons, to be settled by a justice of the peace. Carriages to be drawn by horses, and not by locomotive engines. The regulations for working the lines are to be approved by the Commissioners of the Metropolitan Police. In fact, the provisions of this Bill are permissive; it contains no compulsory clause for obtaining land or right of way. It simply gives power to local authorities to authorize the making and working of a tramway. This is Mr. George Train's Bill.

The London Tramway and Despatch Company, "for establishing tubes and tramways under and along the streets of the metropolis, for the conveyance of parcels, letters, and messages, and for facilitating omnibus and other traffic," only recites in the preamble of the bill, that "the construction of a railway or tramway from Knightsbridge, in Middlesex, to Wellington Street, in Southwark, would be of public and local advantage." The works to be authorized are, a tramway, commencing at the corner of Knightsbridge and Sloane Street, proceeding eastward to Hyde Park Corner, along Grosvenor Place, to the new Victoria Terminus, and thence along the Vauxhall Road and Bridge, Upper and Lower Kennington Lane, High Street and Causeway, Newington, and terminating at the corner of Wellington Street, St. Saviour's, Southwark. The tramway is to be constructed as near the centre of the streets as may be, except where the convenience of the public using the street may render deviation necessary. It is to be completed in three years. Plans have been deposited in the usual manner. The company propose to take compulsory powers. Carriages may be drawn by animal power. It does not appear on the face of this bill, but it is, we believe, said to be an attempt to establish an atmospheric railway on an improved plan, as well as a pneumatic parcel post.

The Carriage Track Company promotes a bill "to lay down and run tracks of iron in various streets, roads, and highways, in England and Scotland." The preamble recites that objections have hitherto existed to the general use of iron rails and tracks by reason of the elevation or depression of the rails disturbing the level of the road, without presenting such a service as would enable ordinary carriages to avail themselves of the said track, and that a system of iron tracks and carriages has been invented by Joseph Gibbs to obviate these objections. The enacting clauses give power to road authorities to consent to the company making and working tracks by a majority, and by writing signed by any three. The company incorporate the 18th, 19th, 20th, 21st, 22nd, and 23rd Clauses of the Railways Consolidation Act, 1845. The capital is fixed at £50,000.

DEATH OF SAMUEL CLEGG.

This day the grave closes over the mortal remains of Samuel Clegg. He has passed away, full of years and crowned with honour, but the memory of "the father of gas lighting" will be cherished as long as ingenuity, skill, energy, truth, and rectitude are valued among men. He breathed his last peacefully on the 8th instant, at the residence of his son-in-law, in the Adelaide Road, near Hampstead, at the advanced age of 79, in full possession of his faculties, which remained bright and clear to the end.

Samuel Clegg earned for himself a world-wide reputation as the founder of a system of artificial lighting that completely revolutionized former methods of illumination, and which, among the many inventions of the present century, yields only to railways and to the electric telegraph in its influence on the social and economic condition of society. Of the importance of this system—which, if not invented, was at least first successfully established by the efforts of Samuel Clegg—some idea may be formed from the amount of capital and labour employed in its operation. In this country alone the capital invested in gas-works is estimated at not less than £30,000,000, in addition to the sums employed in the various trades associated with the supply of gas, including ironfounders, fire-brick makers, tube makers, brassfounders, meter manufacturers, gas-fitters, &c., &c. It is no small consideration also that all the apparatus employed is of native manufacture, and that every shilling expended is applied in employing the labour of our countrymen. The value of the gas annually consumed in the United Kingdom is estimated at £5,000,000, and the coal used in the manufacture amounts yearly to the enormous quantity of 3,500,000 tons. Nor is the influence of gas lighting on the capital and labour of this country limited to those sums, prodigious as they seem, for the coal and iron used in foreign gas-works are principally derived from England. Such is a brief outline of the extent and influence of the new industry that was mainly created by Samuel Clegg. Winsor, the two Crosleys, John Malam, and many other of his coadjutors in the great work, have long preceded him to the grave; but we have yet left among us Lowe, Neilson, G. H. Palmer, and Grafton, as connecting links with the past—men who strenuously laboured with him whose death we now mourn in overcoming the obstacles that stood in the way of the success which they ultimately accomplished.

Samuel Clegg was born at Manchester on the 2nd of March, 1781. His scientific education was chiefly directed by the well-known Dr. Dalton, and he was afterwards apprenticed to Messrs. Boulton and Watt, at the Soho factory. In that school, where Watt and Murdoch were bright exemplars, he was thoroughly trained in the practical details of engineering. Mr. Murdoch was then carrying on his experiments for the application of coal gas as a means of illumination, and Clegg's active mind entered eagerly in the investigation. It was not long before he rivalled, and even surpassed, his master, and whilst Mr. Murdoch was making arrangements for the lighting of Messrs. Phillips and Lee's cotton mills at Salford, young Clegg was similarly employed in lighting the cotton mill of Mr. Henry Lodge, at Sowerby Bridge, near Halifax. The gas engineer of the present day can scarcely conceive the difficulty of such an undertaking at that period, when the little that was known of the requirements of gas lighting could be but imperfectly executed, when every step was in a strange land, surrounded with obstacles and supposed dangers, and obstructed by prejudice and fear.

In the first attempts at gas lighting, the gas was supplied to the burners without being purified; but it soon became evident to Mr. Clegg that, unless some effective plan of purification was adopted, it would be impossible to burn gas in closed apartments. The use of lime suggested itself to his fruitful mind as a means of absorbing the impurities of the gas. He applied it in the next manufactory he lighted, by adding lime to the water in the tank of the gasholder. This plan proved effectual, but the difficulty of removing the foul lime from the tank presented a serious obstacle to its practical application, until the expedient of conducting the process of purification in a separate vessel was adopted. The plan of purifying the gas thus contrived by Mr. Clegg, in that early stage in the progress of gas lighting, has not been surpassed in efficacy by any subsequent methods. During the time that Winsor was energetically struggling against a host of adversaries to introduce gas lighting in London, Clegg continued practically extending that system of lighting in various parts of the country, adding every year some improvement for removing difficulties, and facilitating the manufacture of gas. The most important of these improvements was the contrivance of the hydraulic main, which has since been adopted with scarcely any deviation from its original design. The first premises he lighted in London were those of Mr. Ackerman, in the Strand, in 1813, which work was so successfully accomplished that he was brought prominently into notice, and in the following year Mr. Clegg was appointed engineer of the Chartered Gas Company. At that time, the works had been so greatly mismanaged, owing to the inexperience of those who had undertaken them, that the company were on the point of dissolution. Clegg's engineering knowledge, and the experience he had gained in lighting private establishments, enabled him, after encountering great difficulties, to rescue the company from ruin, and to place their works in a satisfactory state.

It was in 1815, when thirty-four years of age, that he directed his attention to the construction of an instrument that would register the quantity of gas that passed through it. His first attempt to register the gas was by the alternate filling and emptying of bladders filled with gas, the passage between them and the burners being opened and closed by mercury seal valves. These attempts failed, owing to the destruction of the membrane by the action of the gas; but Clegg was never discouraged by failure, and, after having vainly endeavoured to construct a dry meter that would work satisfactorily, a water meter was contrived, for which he took out a patent in 1816. This water meter displayed inventive genius of the highest order; and, though it has been successively greatly improved, none of those improvements, either singly or combined, are at all equal in ingenuity and originality to the first instrument, which, without any model to serve as a guide, accomplished the measurement of gas by a self-acting machine, propelled by its own elastic force.

The success of the Chartered Gas Company induced the establishment of similar companies in other parts of London, and in the provincial towns. Mr. Clegg's aid was eagerly sought for in forming those works, and, among others, he largely increased the works of the Imperial Company.

Abandoning then, for a time, his connexion with gas lighting, Mr. Clegg joined an engineering establishment in Liverpool, which was not successful. The assets of the firm of which he was a partner paid 17s. 6d. in the pound, and it may be stated to the honour of Mr. Clegg that within the last six years he paid the balance to the creditors. He afterwards accepted the appointment of engineer to the Portuguese Government, and in that capacity he reconstructed the Mint at Lisbon, laid out several roads, and executed other public works. On his return to this country, he devoted his time and energies to the invention and perfection of the atmospheric railway. The failure of that plan of railway locomotion was a great disappointment, though he bore it manfully. Not long afterwards, in 1847, he was appointed by the Government one of the surveying officers to conduct preliminary inquiries on the spot on all applications for new gas bills.

Mr. Clegg's mind frequently reverted to the improvement of the gas-meter, and about the year 1841 he brought out a dry meter, which is described in the second edition of his son's "Treatise on Coal Gas." His late years were chiefly devoted to the perfection of a wet meter on a new principle, on which he placed great confidence; and his last days were cheered by the approvals bestowed on it by many eminent gas engineers. In private life, his natural reserve and diffidence prevented Mr. Clegg from being known and appreciated to the extent which his genius and acquirements would otherwise have commanded; but to his intimate friends he was endeared and respected by his sterling integrity of character, by his affectionate disposition, and, by a happy flow of spirits, which he retained to the last. His was not a death of disease and pain: it was the wasting away of the lamp of life, which, after having, during a long career, shone brightly on the world, flickered and expired.

Circular to Gas Companies.

The hard frost which, with only a few days intermission, has continued since the 20th ult., has severely taxed the resources of the gas companies in all parts of the kingdom. With the canals frozen up, the river navigation obstructed, and in many instances completely closed, and with the railway communication impeded by heavy falls of snow, especially in the north, it has been with difficulty that the necessary quantities of coal could be procured to meet the large demand for gas at this season. It is satisfactory, however, to find that under these difficulties the gas companies have fulfilled their engagements with the public; the only exception of which we have heard being the corporation gas-works at Halifax, which, though in the midst of a coal district, completely broke down. Even the navigation of the Thames has been entirely stopped for some days by the accumulation of large masses of ice, and the requisite quantities of coal to supply gas night and day during the late foggy weather could only be procured at unprecedented cost. The Great Central Company have experienced less difficulty in obtaining supplies than any other of the metropolitan gas-works; for the recent obstruction to ordinary means of conveyance has fully proved the advantage of the railway communication from the retort-house to a dock accessible at all times and in all weathers.

The form of accounts to be filled up by the metropolitan gas companies, in compliance with the 41st section of the Metropolis Gas Regulation Act, has given rise to discussion; and Mr. Beal again appears on the scene, dictating to the Home Secretary the accounts to be demanded. By the Act, the Secretary of State is authorized to require from each company an annual statement of their accounts, mentioning precisely the amounts of capital, the "authority under which the same is raised, and such other information as the said Secretary may require, in order to enable him to ascertain the actual state and condition of the concerns of such company." The companies accordingly applied to Sir Cornewall Lewis to be furnished with the forms of the accounts he should require, and the right honourable gentleman, being ignorant of the details, sought for information from Mr. Beal, and thus virtually delegated to the active antagonist of the gas companies the authority granted by the Act. Mr. Beal was, no doubt, delighted at this opportunity of annoying the companies under cover of the Home Secretary, and he recommended that they should be required to produce, not merely an *account*, but a copy of their books; for such, in reality, would be the effect of complying with his recommendations. In addition to full details of the capital account of each company, both share capital and borrowed, Mr. Beal wants to have before him the current account of revenue and expenditure in every particular. He includes in the former the amount realized from the sale of gas to private consumers and for public lighting, specifying the respective quantities and the rates charged; and he wishes to know the amount received from the sale of all residual products, separately stated. In the expenditure account, his demands are still more extensive and precise. He requires, in the first place, the cost of coals, specifying the number of tons of each kind, and the price per ton; the cost of purifying materials; the cost of stores, excluding those used for extensions or increase of works; the amount of wages strictly applicable to carrying on the works; the cost of meters, distinguishing those in stock from those actually used; commissions for collecting gas-rents; bad debts; a detailed statement of the application of the depreciation-fund, &c. &c.

It might be supposed from these required particulars that the Home Secretary and both Houses of Parliament, before whom they are to be laid, were intended to act as auditors of the companies accounts, otherwise they could be of no use. Such a throwing open of the minute business transactions of a trading company would merely gratify prurient curiosity, and serve as pretexts for alleged grievances, whilst it would be extremely galling to the directors. The Home Secretary has, very properly, sent a copy of these recommendations to the gas companies, for their consideration, and he expressed at the same time a desire to hear their observations on them. Those observations, we may presume, will convince the right honourable gentleman that such accounts as Mr. Beal wishes to possess would be incompatible with independent action, and could answer no useful purpose. We have on several occasions referred to the accounts of the South Metropolitan Company as models to be copied, and it is to be regretted that the companies did not agree to adopt so excellent an example in the first instance, and submit it to the Home Secretary. In that case, most probably, the form of the accounts to be presented would have been satisfactorily arranged without the intervention of Mr. Beal.

The remarks made in our last number respecting the tender of the Chartered Gas Company for the supply of gas to public lamps in Marylebone, were written under the impression that the contract which expired at Christmas last, and the renewed contract, were identical in terms; whereas, it appears that the former was for the supply of sufficient gas to give the light of 8 candles, while the latter is for 4 cubic feet per hour, of ordinary Newcastle gas; and, as the company have adopted the resolution of charging one uniform rate per 1000 feet to all classes of consumers for gas of the same quality, the advance to £4. 11s. per lamp has been made to carry out that principle. We have long foreseen that great inconvenience must ensue from the want of uniformity in the action of the thirteen independent bodies that have undertaken the supply of gas in the metropolis, and this will especially be the case wherever a parish is divided between two or more companies. Thus, in Marylebone, the Imperial Gas Company are content to perform the same service in the less populous parts of the parish for £3. 7s. 5d., for which the Chartered Company, in the vicinity of Oxford Street, require £4. 11s. Bermondsey, again, has three contracts to make, and the three companies agree to supply the public lights by contract, and to light, extinguish, clean, and repair them, at £4. 5s. per light; two, however, are willing to deduct 15s., if the parish authorities will light, extinguish, clean, and repair, while one will only permit their own officers to light and extinguish. Two of them are willing to supply gas to the public lamps by meter at 4s. 3d. per 1000 feet, and one at 3s. 6d.; and so we apprehend it will be found throughout the metropolis while the existing disunion prevails.

We allude with reluctance to the unsatisfactory and anomalous posture of the affairs of the Surrey Consumers Company, as displayed at an extraordinary meeting on the 31st ult., of which a full report appears in another part of the Journal. It is by no means uncommon for directors and shareholders to quarrel among themselves, and for both to be dissatisfied with their contractor when dividends fall short; but, when a company is prosperous, and a contract is mutually remunerative to shareholders and contractor, congratulations are generally heard, and not dissensions. That the condition of the Surrey Consumers Company has greatly improved since the works were leased to Mr. Croll is not denied. It seems to be equally certain that he has derived large profits from the undertaking, and many of the shareholders not unnaturally conceive that they ought to share them all; but, whether they would reap more advantage from taking the management into their own hands than by renewing the contract, is the point on which they are divided. It is no longer a question whether the lease should cease at the end of this year, or be continued till the following summer; but, whether a new contract should be made for four years and a half longer, or whether Mr. Croll should be appointed managing director. Neither of those propositions, however, seems to be in accordance with the provisions of the Gas-Works Clauses Act, which distinctly specifies that, when the profits of an undertaking are sufficient to divide more than 10 per cent., the excess shall be applied to the reduction of the price of gas; no margin being allowed for contractors profits, or authority given to the directors to delegate to a managing director the powers which the Act invests in them. The feelings of animosity exhibited, and the disputes among the directors, in debating these questions, are a public scandal, and must be prejudicial to the interests of the company whatever course be adopted. The appointment of a committee of shareholders to confer and consult with the directors, and to mature some plan for the proper management of the company on the termination of the contract with Mr. Croll, to which resolution the meeting unanimously agreed, seems the most advisable measure that could be adopted, and it is to be hoped that the result of their combined action will be to restore harmony among the directors and shareholders.

Correspondence.

GAS AND WATER IN VALPARAISO.

Sir,—Having just completed the accounts connected with this establishment for the past year, I think it may not be uninteresting to you to know how gas matters progress in these regions. I am happy to say that, owing to the continuance of tranquillity in political affairs throughout the country, business has been comparatively good during the year. This has caused a steady increase in the consumption of gas, amounting in the gross to about 24 per cent. as compared with last year; but, to meet the threatened competition of a new company, my directors reduced the price to 5 dollars per 1000 feet. Notwithstanding this reduction, the net profits on the sale of 26 millions of feet amount to 38,000 dollars, or 17½ per cent. on the capital, besides some 7300 dollars which I have expended out of revenue in the erection of a warehouse and dwelling-house. For the greater portion of the year, I have been working clay retorts, though I had some little difficulty with my stokers when I first commenced, but now the results are quite equal to the average of English workings. But I must not forget to mention one remarkable fact which I have noticed, and that is, the small amount of carbonaceous deposit on the inner surface of the retorts. I have two benches of five retorts each, which have been constantly at work for eight months. These have been charged alternately with Boghead cannel, Newcastle and native coal, and yet there scarcely appears a trace of carbon, although they have not been scurfed for a single hour. My average working pressure (without an exhauster) is 5 3/10th inches: I have had an exhauster at work for the last two months, but do not observe any material advantage. My average make per retort charged has been 3400 cubic feet English, using from 17 to 20 per cent. of Boghead. With reference to ordinary English gas coal, I find it undergoes a very marked change by the time it arrives in this country, particularly in reference to its gas-producing properties. The quantity per ton is considerably less than in England, but its illuminating power is also reduced to an extraordinary degree. Having run short of native coal, I had to use Newcastle and Boghead, and found my gas went down from 18 candles to 13 and 14 candles. This led me to make a series of special experiments; and, after repeated observations, I found the average illuminating power of the gas from Newcastle coal to be only 7·6 candles, with retorts at a very moderate heat, and five hours charges. I have no doubt a very large proportion of the volatile hydrocarbons is evolved during the voyage, and also when the coal becomes exposed to the peculiarly dry atmosphere of these latitudes. If it were not for the coke, I should certainly discard common English coal for gas purposes in countries like this.

A few weeks ago, I received some samples of coal from the vicinity of Concepcion: it has a peculiar appearance, and burns very much like Yorkshire cannel. The seam is about 16 inches thick, and I have advised the proprietors to work a level for a short distance, and endeavour to ascertain more perfectly the character of the deposit. If it should turn out to be only an inferior description of cannel, it will yet be very valuable for this coast and for Australia.

By-the-bye, I had some Australian cannel sent some few months ago, but it proved only an inferior description of splint, and contains an enormous quantity of sulphur. I am sorry to say, that the whole of the native coal here is very impure, from excess of sulphur: this renders my cost of purification very great; and, as it has averaged 15 cents., or 7¼d. English, per 1000. I am now about to try the oxide process—with what success I must leave time to show.

In my former letter to you, I mentioned the fact of a new company being in course of formation; it is now in existence, and the Government have granted them a piece of public land, on which to erect their works. A house in Glasgow, has been applied to, to furnish the machinery and apparatus; but I hear the directors have some difficulty in getting the calls paid up. It is altogether a most reckless speculation, for the simple reason, that the Government contract with the existing company makes it imperative on the municipality to pay at the rate of 84 dollars per lamp per annum for 450 public lamps, or up to 600 if the municipality require them. We have now 580 lamps, yielding a gross rental of 47,500 dollars per year; this income pays 84½ per cent. of the entire working expenses, so that in case of competition our company could sell the gas to the private consumers at 2 dollars per 1000 without running any risk of loss: but the new company is entirely a political dodge.

I see, by one of the Journals that came to hand per last mail, that in England you are beginning to talk about street railways; here we are beyond the talk, as there is one on the eve of being commenced, to run from one end of the city to the other. The parties interested are very sanguine of its success; but, for my own part, I have considerable doubts. That it will prove of advantage in transporting heavy loads, I am convinced; but, from the peculiar situation of some of our principal thoroughfares, I am also certain it will be a great inconvenience to the general traffic; and I fear it will be the cause of serious injury to the gas company, unless I can induce the engineer of the scheme to reconsider some important points in his plan.

During the past year, I have been much engaged in preparing a plan for the supply of the city with water. We have already an apology for a water-work, equal to about one-twentieth of the demand. The cost of the reservoir and pipes has been nearly 100,000 dollars. Several plans have been proposed to afford an efficient supply, but all, in my opinion, too costly for the country. My scheme is based on the gravitating principle, and I propose to obtain a supply by impounding the water which comes down one of our principal *quebrattas*. The ravine itself would form a reservoir capable of storing 65 million gallons by running a wall or embankment across the narrow outlet of the valley. The bottom of this reservoir would be about 180 feet above the level of the town. The distance from the reservoir to the centre of the town is not quite two miles. So far as the public are concerned, I believe the majority are in favour of my proposal, but the Town Council and the Government have granted a patent to a gentleman who commenced a canal some years ago to bring the water of the river Quillota into Valparaiso. The distance the water will have to come is nearly seventy miles; not quite one-half of the distance is complete, at an expenditure of 300,000 dollars. The patentee could not raise any more money, and it was thought the scheme was abandoned; but, since my plan has been brought forward, the other parties have applied to the Government for an extension of their patent; and I believe an agent will leave here by this steamer with a view to endeavour to raise a company in England to provide the requisite capital of 850,000 dollars; but I am certain the affair will not pay 2 per cent interest, even if the water reached Valparaiso. Judging, however, from the condition of the portion of the works already completed, I think it would be extremely doubtful if the water could be got here by the present canal.

The sanitary condition of the city is wretched; the want of water, of course, renders any attempt at drainage impossible. Were it not for the prevalence of the south wind, the city would soon become one vast cesspool; and, instead of the "Vale of Paradise," it may not be inappropriately called the "Valley of Death." As the population increases, disease increases in a much greater proportion, and of types unknown before. But I must draw this desultory epistle to a close.

The Journal of Gas Lighting is the most treasured of all my English news, and I certainly feel terribly disappointed when it does not make its appearance by our fortnightly mail.

Gas-Works, Valparaiso, Nov. 17, 1860. H. G.

SUPPLY OF GAS BY METER TO PUBLIC LAMPS.

Sir,—This company supply gas to the public lamps by meter. There are six—two wet ones and four dry ones—placed at the foot of six lamp-posts, the average of which is taken for all the lamps, provided that the meters register accurately. Lately two of the dry meters have registered 10 per cent. slow; one has registered 6½ slow; and one, 1½ fast. On this account, the company have not taken the average from them; only from the wet ones which have been correct. The Local Board of Health refuse to pay the bill unless the average is taken from all. Can we compel them to pay it? If so, why and how? We have made no agreement respecting the inaccuracy of the meters, therefore, they say, we are compelled to abide by them. They say in *all* cases we are obliged to charge according to the registration of the meter. Before taking legal proceedings, we ask your advice.

John Morton, Manager.

Gas-Works, Aughton Street, Ormskirk, Jan. 9, 1861.

[The index of a meter is *prima facie* evidence of the quantity of gas consumed; and, to substantiate a claim for a larger quantity, we apprehend proof must be given, not only that the three dry meters in question, in their present state, register less than the quantity consumed, but that they have done so throughout the whole period during which the charge accrued. If, however, upon examining their registration for corresponding periods of previous years, and comparing them with the registration of the wet meters during the same periods, it should appear that the registered consumption of gas through the dry meters has fallen off, a claim for a reasonable addition may be sustained.—Ed. J. G. L.]

Register of New Patents.

1532.—Henry Jones, of North Devon Pottery Company, Annery, near Bideford, for "*Improvements in water-closets.*" Patent dated June 23, 1860.

This invention has for its object improvements in water-closets. For these purposes the basin, which it is preferred should be of a conical form, is made of glazed pottery or earthenware, with a flange around the upper edge thereof. The basin is set in a vessel, by preference of a cylindrical form, which is of glazed pottery or earthenware, and made suitable at its upper end to receive the flange of the basin, and to admit of its being cemented or luted air tight where they come together. The bottom of this outer vessel is closed, there being a side outlet suitable for connecting with a glazed earthenware pipe. Below the end of the basin, there is a pan of glazed pottery or earthenware, made with nicks or axes, which are received into bearings formed within the outer vessel near the bottom. The pan is so hung on its axes that, when full of water, it will stand horizontal, and the water therein will rise above the lower end of the basin. The front part of the pan is made with a spout, so that, when tilted, the water and soil will be completely emptied therefrom. At the back of the pan a suitable connexion is made to a handle on the side of the closet, such

connexion where it passes out through the seat being made air-tight by vulcanized indiarubber or otherwise.

The claim is for the combination of a glazed earthen or pottery ware basin, with a glazed earthen or pottery ware outer vessel, and a glazed earthen or pottery ware pan, with its axes working on bearings, as herein described.

1544.—William Higginbottom, of Whitlington, Derbyshire, contractor, for "*Improvements in pipe-joints and valves for gas or water-mains, and sanitary purposes generally.* Provisional protection only obtained. Dated June 25, 1860.

This invention relates to a peculiar and simple form of joint for earthenware or metal pipes, whether intended for the conveyance of gas, water, or drainage; also to the construction of sluice-valves and hydrants to be used in connexion with such pipes, and consists in joining or connecting the ends of the pipes without the aid of the ordinary socket, cast or formed on the pipe itself, by means of a loose socket, composed of metal or earthenware, and having a cavity inside, into which is forced, by hydraulic or other powerful pressure, a suitable cement, which surrounds the joint, and when hard renders it perfectly water-tight, and strengthens the pipes at the part. The shells of the valves and hydrants are made of earthenware, in lieu of cast iron, and the valve-facings are fitted into their places by the same process described in reference to the pipe-joints; that is to say, by forcing cement round the valve-facings after they have been placed in their proper position. By the use of the peculiar pipe-joint above referred to, with earthenware pipes and the earthenware valve-facings and hydrants, a great saving of water is obtained, as the water being kept purer, the necessity for running off or cleansing the mains is obviated, whilst the cost of the materials is considerably reduced.

1563.—Christopher Binks, of Parliament Street, Westminster, London, for "*Improvements in manufacturing oxygen gas.*" Provisional protection only obtained. Dated June 28, 1860.

The object of this invention is the economical production of gaseous oxygen for the various art and manufacturing processes to which that element is applicable. It consists in effecting the decomposition of water, free or combined, or in its ordinary form, or in that of steam, through the agency of chlorine mixed with or brought into contact with it under a high temperature, and the conjoint action of any substances capable of retaining or of fixing by combination or otherwise the hydrochloric acid formed by the re-actions between the hydrogen of the water and the chlorine, but not capable of retaining or of fixing the oxygen which is thus set free in its gaseous form.

1586.—Richard Laming, of Clifton Villas, Maida Hill West, Middlesex, and Charles Smith, of 8, Gloucester Street, Regent's Park, London, for "*Improvements in purifying certain gases and liquids from sulphuretted hydrogen.*" Patent dated June 30, 1860.

This invention consists of depriving of sulphuretted hydrogen the gases obtained by distilling coal and similar matters, and also solutions of hydrosulphate of ammonia, by the repeated use of oxides of manganese and iron, so prepared by mechanical means or heat, as to have their molecules, or minute particles, in a state of extreme division, similar to that which has heretofore been conferred upon oxides of manganese and iron repeatedly used for the said purification only, by or after precipitating them from their solutions.

The invention also consists in applying to the same purposes hydrated and precipitated oxide of iron, to the purifying energy of which increased permanence has been given, by mechanically distributing the pure unmixed oxide, while in its fresh undried state, over the surfaces of dried sawdust, or other absorbent and porous matter.

The patentees point out a natural principle implicated in the invention, in order more clearly to make known in what the invention consists, and the means for carrying it into effect. Certain oxides of manganese and iron are what is called hydrated, that is to say, they have a small proportion of water chemically combined with them in a dry state; and sometimes when these hydrated oxides are formed by precipitation from their solutions, they carry down along with them some other water, in addition to the excess of water over and above what is necessary for their hydration, making them wet or damp, and clinging to them mechanically, or what is called more tenaciously, than if the oxides had been only wet with water after they had become dry hydrates, by exposure to the air. Now, it is well known that hydrated oxides, generally speaking, are more susceptible of chemical action than such as are anhydrous, and that fact has suggested a prevalent belief that hydration of the oxides is the necessary condition of their chemical activity; but this invention is derived from another belief—namely, that the cause of great chemical energy in oxides is a condition of perfect separation between their molecules, or minute particles, however produced, and which condition hydration is only one among other means of establishing; for when mechanical water is carried down with a precipitated oxide, it confers upon it a greater volume than the water of hydration alone would give it, and, at the same time, makes it more chemically energetic. This belief was also founded upon another fact which had been observed—namely, that when care had been taken to keep the molecules, or minute particles, of an anhydrous oxide from coalescing from the moment of its formation, its chemical activity is sometimes greater than that of hydrated oxides whose molecules, or particles, have had nothing solid between them to prevent their coalescing into a compact mass.

Oxides of manganese and iron may be made by several chemical processes, with their molecules, or minute particles, widely separated; but the patentees have ascertained that the state of separation which may be given by cheaper mechanical means to the molecules, or minute particles, of such of the said oxides as are found ready made, either in nature or as residues of processes in the arts, also confers upon them great effectiveness.

1. With reference to oxides of manganese. Native black oxide of manganese, in its commercial condition of coarse powder, has, in times past, been applied to the purifying of the above-named gases, an attempt being made to recover from it, after use, some oxide that would be repeatedly serviceable for the purifying. The first cost of the oxide being considerable, and the roasting process inefficient as well as expensive, the process was unsatisfactory, and soon abandoned. The patentees use, among others, the native black oxides of manganese, and recover from them, after use, and by inexpensive means, a revivifiable oxide that may be satisfactorily used for purifying the gases a great number of times in succession. All the native oxides of manganese, that they have tried answer the purpose, but they prefer such as are most free from earthy impurities, and most easily reduced to powder. They find, after that, instead of the native oxides, they can, with effect, substitute for them the red or brown oxides of manganese that commonly result from raising artificial or native compounds of the metal to a high temperature. Having selected the oxide intended to be used, the first care is to reduce it as far as convenient to an impalpable powder, by grinding it either dry or wet, as, for example, is practised upon various materials by colour makers and potters, and that done, it is preferred to follow the operation of grinding by an elutriation, or water-washing, whereby to float away the finer particles from among the grosser, and cause them to be deposited separately in another vessel. This process of elutriation is well known in the arts, and needs here but few words of description. The patentees practise it, by stirring the ground oxide into water contained in a tank, that may be three or four yards square and as many feet deep, until there is reason to believe that the whole of it is thoroughly mixed with the water; the contents of the tank are then allowed to remain at rest until the gritty particles of the oxide have subsided to the bottom, for which a few seconds will generally suffice. The supernatant water is then run off, by a large opening, into a second tank, placed at a lower level, into which the water carries with it the impalpably fine particles of the oxide which it has temporarily suspended, and there very soon deposits them. Should too long a rest have been allowed, much of the impalpable powder will have gone down in the first tank with the grosser particles, in which case a repetition of the operation should be had recourse to, for transferring it into the lower tank. After some minutes rest in the second tank, the water is run off from it without disturbing the sediment. The fine deposit is collected and drained on sand or other filters, and they are then either dried at atmospheric temperatures or by air heated to about 80° or 90° Fahr., or it is mixed while wet with as much dry sawdust, or other porous matter, as will make it into a damp, granular, and pervious mass. There is an oxide of manganese, which is made artificially by heating the carbonate of the metal till it parts with its carbonic acid. The process for making it was described in the original specification of the patent granted to Richard Laming, bearing date the 4th of November, 1847; which also directed it to be used for purifying gas. The oxide is made either black or brown; and it is now found that, by exposing freely to the air the sulphide of manganese, which results from passing through it the gases fouled with sulphuretted hydrogen, it contains a revivifiable oxide susceptible of being used with effect in place of the other oxides of manganese above mentioned, and for which it is proposed occasionally to substitute it.

The patentees use for their invention of purifying the gases one or other of the above-named oxides, which they prefer to make pervious, by admixture with sawdust, or other porous matter; they then part the mass in thick layers, and in a damp condition, into dry purifiers, and continue it there, subject to the action of the passing impure gases, until the oxide has become a sulphide of manganese, when they expose it to the action of the atmosphere, either in or out of the vessels, as is practised in case of gas purification by oxide of iron. That exposure changes the sulphide into an oxide, fitted for, and which they apply to, initiating a repetition of the alternate purifying and revivifying operations an indefinite number of times; or instead of so frequently alternating the gas purification and the oxide revivification as two distinct operations, they propose sometimes to mix with the gases about to be purified a volume of oxygen gas about as great as that of the sulphuretted hydrogen contained in it, or, in place of oxygen, about five times the volume of atmospheric air, by which means the purifying action of a charge of oxide may be greatly prolonged, and the revivifying process proportionately postponed.

They use for their invention of purifying from sulphuretted hydrogen gas liquors, gas washings, and other solutions of hydrosulphate of ammonia, one or other of the above-named oxides, by bringing it in sufficient quantity into temporary contact with all the liquor to be purified, and which is effected either by well stirring the oxide in its wet or dry state into the liquor, or by using it mixed with porous material as a filter to pass the liquor through. In both cases, the sulphide of manganese which results from the purification is converted into a revivifiable oxide for repeated use, by freely exposing it to the atmosphere at ordinary temperatures in any known manner that may at the time be most convenient.

2. With reference to oxides of iron. The patentees take hematite native oxides of iron generally, and other compounds containing that metal and oxygen, which result as residues from different operations in the arts conducted at a red or other high temperature, preferring in all cases such as are purer, softer, and more friable than the rest; and, having reduced them to the condition of fine powder, so far as is convenient, by grinding, they next separate the impalpable from the grosser parts by elutriation, as already described with respect to oxides of manganese; and then, having collected and drained the impalpable portion, they proceed at once to mix it while wet with such dry sawdust, or other convenient absorbent matter, as will give to the resulting mixture the form of a damp, granular, and porous mass.

The patentees here explain that, by thus promptly mixing finely-divided oxide with the porous matter, they perpetuate the good effected by the elutriation, as they thus keep separate the molecules, or minute particles of the oxide, which they find, in the cases both of iron and manganese, to have a tendency to recombine into a hard and comparatively inefficacious mass whenever they are long left close together, even when they have been produced by precipitation from solution. They sometimes separate the precipitated or hydrated oxide of iron, when it has been thrown down unmixed from its solution, and prolong its purifying energy by thus absorbing it while wet into dry sawdust, or other convenient absorbent matter. With the porous material made as above stated, they purify the gases and liquors above mentioned, using it and revivifying it in the manner already practised with artificial precipitated oxides of iron, and also with native oxides of iron prepared by mechanical means without the elutriation. When the purifying vessels are sufficiently large, the elutriated oxides may be dried in the air at ordinary temperatures, or a few degrees

higher, and used upon the gases without being first mixed with porous materials; but that manner of using them is not recommended. It is proposed sometimes to mix with the elutriated oxides of iron, when to be used for purifying the gases, whether alone or made into a more porous mass, about 5 or 10 per cent. of slacked lime, or chalk, in order to impede their gradual conversion into the less useful subsulphate of the metal during the process of revivification.

The patentees claim, with respect to oxides of manganese, purifying from sulphuretted hydrogen, first, the gases obtained by distilling coal and similar matters; and, secondly, gas liquors and similar solutions by the agency of native or artificial oxides of manganese reduced to powder by mechanical means, or all oxides made by heating the artificial carbonate, conjoined with the repeated use of the oxide, which is produced in an effective condition by exposing to the air at atmospheric temperatures, or thereabout, the metallic sulphide which results from each purifying operation.

They claim also the said purification of the same gases by the said mechanically prepared oxides, when it is done simultaneously with the use of oxygen gas or of atmospheric air, mixed with the gases preparatory to their purification.

They claim, with respect to oxides of iron, purifying from sulphuretted hydrogen the gases obtained by distilling coal and similar matters by means, firstly, of elutriated oxides of iron, in contradistinction to those which are either reduced to the impalpable state by precipitation from solution, or left, by the unaided process of grinding, in the condition of coarse powder, parts of which latter are necessarily too coarse to be very effective. Secondly, all oxides of iron generally, when incorporated mechanically while in a state of extreme division, and in a wet condition, in the absence of earthy matter with dry absorbent materials, whereby their minute parts are prevented injuriously contracting upon one another by age, or by becoming dried. The claim extends in all cases to the said oxides after their atmospheric revivifications, although their mechanical character or composition may have become thereby changed.

1608.—Thomas Richardson, of Newcastle-on-Tyne, for "*Improvements in purifying coal gas.*" Patent dated July 3, 1860.

These improvements consist in employing metallic iron in a fine state of division, moistened with water, either alone or mixed with a porous material—lime, magnesia, or the sulphates of these earths in the ordinary gas purifiers.

To obtain the iron in a fine state of division, the patentee takes cast-iron cylinders, about 3 feet long, with a rim of about 4 inches thick, and a bore of about 1 inch in diameter, and places them *vis-a-vis* in a lathe; he then brings the surfaces of the rims in contact, and grinds the iron to powder while the cylinders are making five hundred to a thousand revolutions per minute; or it may be obtained from the old metal tubing which has been used in pit shafts, or old metal from any other source of similar character, which is sufficiently soft to be reduced to powder by grinding; or it may be obtained by sifting the iron produced in fitting shops, in the filing, turning, or boring operations, through a sift with about a thousand holes to the inch. This finely divided iron is then moistened with water, and placed on the trays of ordinary dry lime purifiers, where it is employed in the manner already in use when purifying coal gas by means of the oxides of iron; or it is mixed with about three times its own bulk of sawdust, charcoal powder, small coke, or any other porous material, and the mixture used as above described; or it is mixed with sifted slacked lime, or the lime and magnesia obtained by burning magnesian limestone in the proportion of one part of these earths and three parts of the finely divided iron; or one part of finely ground gypsum, or rough Epsoms, is mixed with three parts of the iron powder, and any of these mixtures employed as already described. When the iron powder, or any of the above mixtures, has become impaired in its purifying action by the saturation of the iron by sulphur, it is submitted to a strong red heat in a close furnace, so as to drive off the impurity, and the residue is again fitted for further use.

The claim is for the use of finely divided iron, either alone or mixed with any of the substances described for purifying coal gas.

1612.—François Durand, of Paris, for "*An improved mode of purifying the Thames and other tidal rivers.*" Provisional protection only obtained. Dated July 3, 1860.

The object of this invention is the purifying of the Thames and other tidal rivers, for which purpose it is proposed to construct a canal from the river to the sea, the river-end of it being at or near the city or town or the drainage discharge, or so situated as to carry off the sewerage and fœcal contents of the river in the manner hereinafter described, preferring to have it at that part into which the largest quantity of sewerage is discharged. This canal is to be provided with sluice-gates, locks, or a suitable gate or gates at both ends. When the tide rises, supposing the canal to be empty, the sea-end lock or gate of the canal is closed, and the river-end lock or gate opened, and as the tide rises, the river water driven back by the tide will be impelled into the canal, carrying with it the sewerage and foul matters with which it is charged. When the tide is up to high water, the river gate is also closed; when the tide has gone down to low water, the sea gate is opened, the river gate still remaining closed, so that the contents of the canal will be discharged into the sea. The canal may open at its river-end into two or more points of the river, or, what is the same thing, two or more branches may lead down from the river into the main canal, each branch having its lock, gate, or gates, opening and closing as before described. The canal may serve for navigation purposes, if desired.

1626.—Serge Krotkoff, of 1 b, Welbeck Street, Cavendish Square, London, for "*Improvements in apparatus for employing the electric light.*" Provisional protection only obtained. Dated July 5, 1860.

The following are the advantages which accrue from this improved apparatus for the electric light:—First, to diffuse the light equally on the entire space of which the electric light occupies the centre; second, to render the luminous rays supportable to the naked eye; and third, to collect or unite an undetermined number of the lights, which separately and collectively would participate in these advantages. The above improvements are obtained by means of one or more reflectors, acting circularly in open spaces, and to which are added, for covered spaces, such as towns, reflectors acting obliquely, to light up the street and interior of houses.

1629.—Henry John Standly, of 9, Pall Mall East, London, gentleman, for "*Improvements in the production of gases for illumination and other purposes.*" Provisional protection only obtained. Dated July 5, 1860.

These improvements relate particularly to the production of oxygen and hydrogen gases, and consist in the treatment of water by the agency of the manganate of potassa and the manganate of soda, by means of heat in a suitable apparatus, whereby the decomposition of the water is effected in which they are dissolved into its constituent elements. Oxygen and hydrogen are thus obtained with facility and economy for the purposes of illumination, and various chemical processes and manufactures.

1638.—Emil Biedermann, C.E., of 14, Rockingham Row, New Kent Road, London, for "*Improvements in apparatus for the measurement of gas and other fluids.*" Provisional protection only obtained. Dated July 6, 1860.

This invention relates to several contrivances and appliances for the construction of gas and other meters, by which such meters are rendered more accurate than those hitherto in use, and simplifying the construction and repairing of such meters.

These improvements consist in using two or more cups, vessels, or bells of metal or other material, inverted over and working in water, oil, mercury, or other fluid that may be found desirable. These bells or vessels are connected together by side-levers, arms, or other mechanical attachments, causing them to rise and fall in the water as the gas or other fluid to be measured is alternately admitted to the one or the other. Attached to the pivot or centre of motion on which the vessels or cups oscillate, is attached a lever or arm acting on a kind of escapement, and giving motion to another lever connected to a tube filled with mercury or other ponderous fluid, which tube, on being tilted, causes the mercury to descend to the lower end of the said tube, and through the lever give motion to a slide-valve, or other suitable apparatus, through which the gas or other fluid to be measured has to pass on its way to the cups or measuring-bells. As the mercury gives motion to the tube, and through it to the slide-valve, the gas contained in one bell is discharged or liberated, and a fresh supply admitted to the other, and so on alternately, the quantity or measure of such gas or other fluid being equal to the area of the bells multiplied by the stroke.

The bells are enclosed in an air-tight case partly filled with water, and separated from each other by a diaphragm, open at the bottom, so as to allow a free communication of the water. The bells or cups are by such means each enclosed in a separate air-tight vessel, and the gas being admitted into the space surrounding the outside of one bell, and at the same time under the other, while it is discharged from the opposite sides, renders the bells double acting. The tilting of the tube containing the mercury, by means of the lever before mentioned, passing through an open partition and communicating at the bottom with the water in the above mentioned case, and therefore also partly filled with water, obviates all air or water-tight joints. The levers in connexion with the mercury tube are so arranged as to cause the said tube to tilt always at the same point, thereby ensuring an exact measure of the contained fluid in the bells or cups. The valve is so arranged that the pressure of the passing fluid acts on its outer side, and ensures a correct fit.

The advantages claimed for this invention are, a more correct and absolute measure of the quantity of fluid passing through this meter than in those hitherto constructed, facility and simplicity of construction and repair, and the fact that the alteration of the level of the water in the meter, from evaporation or other causes, does not interfere with the correct measuring capabilities of the meter so long as the mouths of the bells, cups, or other vessels employed, shall be at all immersed when at the top of their respective strokes.

1640.—John Leslie, Esq., of Conduit Street, Hanover Square, London, for "*Improvements in the manufacture of gas.*" Patent dated July 7, 1860.

This invention has for its object improvements in the manufacture of gas. For these purposes, in distilling coal or other substance, the gas, in place of being conducted off from the upper part of the retort, and thence into the hydraulic main, is caused to descend from the retort at the lower part thereof into a chamber, and thence is conducted off by a pipe at the upper part of the chamber to purifiers. The chamber for this purpose may be of any convenient form, having an outlet at the bottom, and a syphon-pipe to run off the fluid condensed therein; also a pipe at the top, to convey the gas to the purifiers. The gas-pipe at the bottom and near the front end of the retort descends into the chamber to about one-third of the depth of the chamber, which it is preferred should be about three feet deep and one foot diameter. Several retorts may be connected with the same chamber, the chamber being suitably enlarged. In all cases, each retort should have a slide or other valve to shut the entrance into the chamber.

In purifying gas, a solution of a salt of copper, preferring the sulphate, is employed to saturate wood-shavings or other porous material, through and amongst which the gas is caused to pass. The purifying matters thus employed are from time to time subjected to the passage of atmospheric air amongst them, to reprepare them for the further purification of gas therewith. The solution prepared is at the rate of one pound of salt of copper to two quarts of water, but the same may be varied. This solution is used to saturate porous matters, such as wood-shavings, sawdust, wood charcoal, or other porous material. These saturated matters are by preference placed in a tower or chamber, 6 or more feet in height, and about 2 feet diameter for one retort. The gas is admitted at the bottom and conveyed off at the top. These purifying matters are from time to time to have streams of atmospheric air passed through them, in order to restore them for being again and again used.

PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTIONS.

2491.—Mary Strang, otherwise Hutchison, of Glasgow, N.B., widow, executrix, *dative qua relict* of George Hutchison, sometime merchant of the same place, for "*Improvements in the manufacture of lubricating oil.*" Oct. 13, 1860.

2982.—Charles William Siemens, of 3, Great George Street, Westminster, for "*Improvements in fluid meters.*" Dec. 5, 1860.

3087.—John Griffith Williams, of Blaenavon, in the co. of Monmouth, gas proprietor, for "*Improvements in extracting inflammable and other noxious gases from coal and other mines.*" Dec. 15, 1860.

3161.—Francis Puls, of 25, Francis Terrace, Hackney Wick, in the co. of Middlesex, chemist, for "*Improvements in obtaining products from coal, gas tar, gas pitch, coal tar, asphalte, resin, and other bituminous and resinous substances.*" Dec. 26, 1860.

3179.—Christopher Binks, of Parliament Street, Westminster, for "*Improvements in manufacturing certain gases, applicable in generating heat and light, and in bleaching.*" Dec. 28, 1860.

NOTICE HAS BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED INVENTIONS.

2009.—Edward Bridgman, of Tarragona, Spain, gentleman, for "*Improvements in the construction of wet gas-meters.*" Aug. 20, 1860.

2117.—William Johnston, metal merchant, and William Ross, brass-founder, both of Glasgow, N.B., for "*Improvements in taps or valves.*" Sept. 1, 1860.

2132.—Henry John Standly, of 9, Pall Mall East, in the city of Westminster, gentleman, for "*Improvements in the production of gas for illumination and other purposes, and the utilization of the products arising therefrom.*" Sept. 4, 1860.

2147.—Walter Robert Kinipple, C.E., of Limehouse, Middlesex, for "*An improvement in water-closets, and in flushing-tanks or apparatuses.*" Sept. 5, 1860.

2148.—John Huggett, of Eastbourne, Sussex, engineer, for "*A method of, and apparatus for, regulating the light in street and other lamps, whereby the re-lighting and extinguishing of the same may be dispensed with.*" Sept. 5, 1860.

2241.—George Davies, C.E., of 1, Serle Street, Lincoln's Inn, London, patent agent, for "*Improvements in lamps for burning coal oil, and other like combustible fluids, part of which improvements is applicable to gas-fittings.*" Sept. 15, 1860.

2451.—Robert Anderson, of Liverpool, in the co. of Lancaster, brass-founder, for "*Improvements in apparatus for economizing and regulating the flow and passage of fluids for flushing water-closets.*" Oct. 9, 1860.

2853.—William Cooke, C.E., of Charing Cross, London, for "*Improvements in ventilating.*" Nov. 21, 1860.

2916.—John Robb, of Aberdeen, N.B., merchant, for "*Improvements in gas-stoves.*" Nov. 28, 1860.

Legal Intelligence.

VICE-CHANCELLOR'S COURT.

THURSDAY, DEC. 20,

(*Before Vice-Chancellor Sir* W. Page Wood.)

HARPER *v.* PEARSON.

Sir H. Cairns, Q.C., and Mr. Baggallay appeared for the plaintiffs; Mr. Rolt, Q.C., and Mr. Speed for the defendants.

This was a bill filed by Messrs. Harper and Moore, of Stourbridge, fire-clay masters, for an injunction to restrain the defendants, Messrs. Pearson, also fire-clay masters, from further issuing or circulating a circular and card or advertisement, or any other similar ones, wherein the defendants should add to their names or descriptions the words "Harpers and Moore," or describe themselves as successors of "Harpers and Moore," so as to induce the public to believe that the defendants were the successors in business of the plaintiffs, or that the plaintiffs had retired from the business of fire-clay masters, or that the defendants were carrying on the same business as had previously been carried on by the plaintiffs.

The facts appearing by the plaintiffs bill, and which were not substantially denied, were as follow:—In the year 1838, Lord Dudley demised to the plaintiffs and one H. Harper certain fire-clay mines at the Therns, and also certain fire-brick works and other premises, situate at the Thorns and the Delph, at Kingswinford, in Staffordshire, for twenty-one years, expiring in March, 1859. The fire-brick-works so demised were commonly known as the Delph and Tintain Abbey Fire-Clay and Brick Works, and consisted of two establishments, called respectively the Delph Works and the Tintain Abbey Works. Throughout this period, the plaintiffs and Harper carried on the said works under the firm of Harpers and Moore. There are three varieties of mineral commonly known as fire-clay, distinguished as "best," "seconds," and "offal." The best clay is wholly free from impurities, and is sold to glass manufacturers for the manufacture of glass-house pots and other similar articles which can be exposed to extreme heat. About three years since, the plaintiffs purchased certain fire-clay mines and other premises in Cradley Park, Worcestershire, where they sank pits and erected extensive works: they called them the Lower Delph Works. They carried on these works and those at the Tintain Abbey Works under the name of Harpers and Moore. The bills of parcels for goods sold by them, were headed "the Lower Delph Clay-Works, nr. Stourbridge," and those at the Tintain Abbey Works, "Delph and Tintain Abbey Clay-Works, nr. Stourbridge." At the termination of the lease in March, 1859, the plaintiffs and Harper gave up possession of the demised premises to Lord Dudley, and they remained unoccupied for fifteen months. In June, 1860, the earl demised the Delph and Tintain Abbey Works to the defendants, Messrs. Pearson, retaining in his own hands the clay mines which had formerly been demised to the plaintiffs and Harper. Since that time, the defendants carried on the business of fire-clay masters at those works, but the clay used by them is not raised by them, but purchased. They did not work any clay mines. The plaintiffs still carry on the said business at the Lower Delph Works, under the firm of Harper and Moore. The superior quality of the fireclay raised by the plaintiffs attracted general attention. They had consequently made large profits by the sale of it. In the early part of November, 1860, the plaintiffs became aware that the defendants had issued a circular, as follows:—

Delph and Tintain Abbey Fire-Clay and Brick Works,
Stourbridge, Aug. 27, 1860.

Gentlemen,—Messrs. Harper and Moore's lease of their valuable works having expired, we beg to inform you that we have succeeded in working the same as lessees of the Earl of Dudley.

The superior quality of this clay for making glass-house pots, crucibles, retorts, &c., being so generally known, we are induced, with full confidence, to solicit the favour of your orders, assuring you that the utmost care on our part shall be taken in the selection and entire management, so as to keep up the high reputation of this establishment. Any orders with which you may favour us shall have our best and prompt attention.—We are, &c.,

E. J. & J. Pearson.

The plaintiffs charged that such circular was issued with the object and intention of inducing the public to believe, and that the public did believe, that the defendants had succeeded to the business of the plaintiffs upon the retirement of the latter, and that the defendants were, in fact, carrying on the same business as had previously been carried on by the plaintiffs, and were supplying fire-clay and articles of similar quality to the fire-clay and articles which had been supplied by the plaintiffs previously to the termination of the said lease, including the articles supplied by the plaintiffs from the Lower Delph Works, and that this clay so supplied by the defendants was of a very inferior quality. On the 19th of November, 1860, certain customers of the plaintiffs, the Southwick Bottle Company, who had purchased large quantities of the best fire-clay of them, wrote to them as follows:—

Messrs. Harper and Moore,

Gentlemen,—We have this day returned you 221 clay-bags, in twelve bundles, which please credit us for. We find by a circular from Messrs. Pearson that they succeeded you in the works, and presume we will have to order from them in future.

The plaintiffs then became aware that the defendants, in addition to the before-mentioned circular, had issued and circulated a card, in the words following:—

E. J. and J. Pearson (late Harpers and Moore), Delph Fire-Clay and Brick Works, Stourbridge, proprietors of best glass-house pot and crucible clay, manufacturers of glass-house pots, crucibles, gas retorts, and fire-bricks of every description.

The plaintiffs then alleged that the words, "late Harpers and Moore," in such card, were inserted to mislead the public, and that the statement in the said card, that defendants were "proprietors of best glass-house pot and crucible clay," was, according to the trade meaning of the phrase, untrue. In answer to a letter from the plaintiffs solicitor, requiring the defendants to withdraw the circular and threatening proceedings, the following letter was written by the defendants solicitor:—

Stourbridge, Dec. 4, 1860.

Dear Sirs,—Messrs. E. J. and J. Pearson have consulted me upon the subject of your letter of the 30th ult., in answer to which I have to inform you that their circular and card were not intended by them to convey the idea, and do not say that your clients have retired from the fire-clay and brick trade, but simply announce that they have, as the fact is, obtained a lease of the working the mines at the Delph and Tintain Abbey, which were worked by your clients. The use of your clients names as those of the former occupiers of this work is necessary for the description and identity of the works. Whilst my clients were consulting me upon your letter, they handed to me a circular issued by yours, by which I observe that the latter have given to their new works at Cradley Park the name of Lower Delph, from which I am able to say, from the knowledge I possess of the locality, there is no legitimate ground; and their object, therefore, in doing this, must plainly be to endeavour to give the impression to the public, that they are still using the Delph mines, which is an unfairness towards my clients of which I think they have just and strong grounds to complain. Under the circumstances stated, your clients have no right to call upon mine to do anything in this matter; but I should not object to advise them to concur with yours in a circular to the trade, stating the facts as they really exist—viz., that yours are carrying on the fire-clay and brick trade from newly-opened mines at Cradley Park, and that mine are working the mines and carrying on the works at the Delph and Tintain Abbey, which were so many years carried on by your clients.

To this the plaintiffs alleged that the name of Lower Delph Works was given to their new works as long as April, 1848. The defendants declining to withdraw the circular and card, the present bill was filed.

Sir H. Cairns now moved for an injunction in the terms of the prayer of the bill.

Mr. Rolt, in opposition, contended that every word in the circular and card was strictly true; that the defendants had a right to use the words "Harpers and Moore" in the way they had done; and, secondly, that it was absolutely necessary, to distinguish the plaintiffs works from the defendants', that the use of such words should be made.

Sir H. Cairns, in reply, said that the statement in the latter part of the defendants circular, "that the defendants would take care in the selection and entire management, so as to keep up the high reputation of this establishment," could only refer to the establishment of the plaintiffs. The defendants was a recent establishment, and could not have obtained any reputation.

The Vice-Chancellor, after stating the facts of the case, and reading the letter of the 4th December, 1860, said, that if Lord Dudley had applied to the court for the injunction it would have been almost a matter of course to have granted it; but it appeared from the affidavit of his lordship's agent that he did not complain of what had been done by any of the parties. He (the Vice-Chancellor) did not think that with respect to the conduct of the defendants, that with regard to some of these letters, they had an improper intention in the matter, although the card, I confess, is the worst part of the case—the card is much worse than the letter; the letter is a circular sent round saying, "Messrs. Harper and Moore's lease of these valuable works having expired, we beg to inform you that we have succeeded them in working the same as lessees of the Earl of Dudley." That is not quite true. In one sense it is, as to the works, but they had not got the mines, and were not to all intents and purposes, the successors of Harpers and Moore. It begins by saying, the lease having expired "we have succeeded them in working the same as lessees of the Earl of Dudley." Where they lessees of the mines and works? These gentlemen were lessees of the works only. Then comes this, speaking of the quality of the clay: "The superior quality of this clay for making glass-house pots, crucibles, retorts, &c., being so generally known," that they have a right to say, that "having bought the clay, we are induced with full confidence to solicit the favour of your orders, assuring you that the utmost care on our part shall be taken in the selection and entire management, so as to keep up the high reputation of this establishment." Now, certainly, the mines had nothing on earth to do with the selection; the mines had nothing on earth to do with the management. There was the earth, good or bad as it might be—very good, we believe, from all we hear in the case, excessively good. But who was to select it? who was to manage the business? Harpers and Moore had done that, and then they say they will endeavour to make such a selection as to keep up the reputation of this establishment. That must mean an establishment connected with the old establishment, which was Harpers and Moore, which would be a strong inference to show that they had come into Harpers and Moore's place, and would keep up the establishment; that is to say, "We have succeeded to the establishment, the establishment is ours, so far as we are successors in the trade." I think it would be very strong on that circular alone. The card is much the worst part of it, because it stands thus, "E. J. and J. Pearson;" then "(late Harpers and Moore), Delph Fire-Clay and Brick-Works," even in the absence of the parenthesis. Finding it in the bill, I looked to see if it was the same on the card, "E. J. and J. Pearson (late Harpers and Moore), Delph Fire-Clay and Brick-Works." It is said it might be the Delph Fire-Clay and Brick-Works, now in the hands of E. J. and J. Pearson (formerly in the hands of Harpers and Moore); but when you put E. J. and J. Pearson (late Harpers and Moore in a parenthesis), it

clearly means that those gentlemen are the successors to the identical trade of Harpers and Moore, and the legitimate successors of course: "We have got the goodwill of Harpers and Moore; we are the successors of Harpers and Moore, and have got their goodwill, and have a right to use their name." That card is the worst part of the transaction. What made me say that I should be very glad if it could have been arranged was this—that the letter of Mr. Corser was in some respects a very proper letter, evidently written on imperfect information. After disputing the right of the plaintiffs to call on his clients to do anything at all, he says, "Under the circumstances, your clients have no right to call upon mine to do anything in this matter; but I should not object to advise them to concur with yours in a circular to the trade, stating the facts as they really exist—viz., that yours are carrying on on the fire-clay and brick trade from newly opened mines at Cradley Park, and that mine are working the mines and carrying on the works at the Delph and Tintain Abbey, which were for so many years carried on by your clients." Now, I think it is rather a strained criticism of Sir H. Cairns to say that necessarily involves writing a joint circular. The circular might be written by A. or B., but it is not at all necessary to have the joint names upon the circular. That would give an explanation which in many respects would be correct, but which in many would be very incorrect—that statement as to working the mines and carrying on the works at the Delph and Tintain Abbey works. Then comes an answer to that letter, which is in this form: —"We have received your letter of the 4th inst. We think you cannot have seen one of the cards, or been made acquainted with all the facts of the case." Then, I rather concur with Messrs. Bernard and King, the writers of the letter. I think anybody looking at that card would say there was a great right to complain: "The card and circular do not in an open manner state, but they lead to the conclusion, that Messrs. Harpers and Moore have retired from business, and that your clients have succeeded them. Customers of our clients have been misled by the card and circular." That is true; I think that gentleman was entirely misled in supposing they succeeded to the business. I do not think he supposed that the others succeeded to the works, but that they succeeded to the whole business. "We must require your clients to give an undertaking not to add to the style of their firm late Harpers and Moore. As we are informed, your clients themselves are not working the clay mines. There should be an undertaking by Messrs. Pearson not to represent, either directly or by implication, that such mines are worked by them, and generally, neither directly nor by implication, to represent that our clients have retired from business, and that you have succeeded them." I think they asked too much. It might not be an unfair thing to ask, in point of law, but they ask too much, because I do not suppose that Messrs. Bernard and King could sustain any bill or proceeding to prevent Messrs. Pearson stating, even supposing it was incorrectly represented, that they worked those Delph mines. But, when you look to their requiring too much in that respect, you cannot help seeing that it was in some degree founded on the request of the other side that the joint circular should represent that they were working these mines together, which would be an incorrect representation, and so far, in all probability, called upon Messrs. Bernard and King to introduce that statement, to say, "We are told you are incorrect in that, and therefore will you undertake in an undertaking of that kind or any other undertaking?" The painful part of the whole case is (and on account of which I was anxious to stop litigation between these parties), that that letter remained unanswered. I have been looking at the dates, and I find that the bill is not filed until the 15th; the letter was written on the 5th and received on the 6th, and the bill is not filed until the 15th; that is nine days clear interval; and, much as I wished to deal with this on the undertaking, I cannot do so under the circumstances, and I cannot do otherwise than grant the injunction; for certainly, as to sending this to a jury, I see no possible reason for it, any more than in the hundreds of cases which one has had to deal with before of this character. There is a clear case that they have represented on the card to the public that Messrs. Pearson are late Harpers and Moore; they have no business to do that, and I must grant an injunction to restrain them from circulating the circular and card.

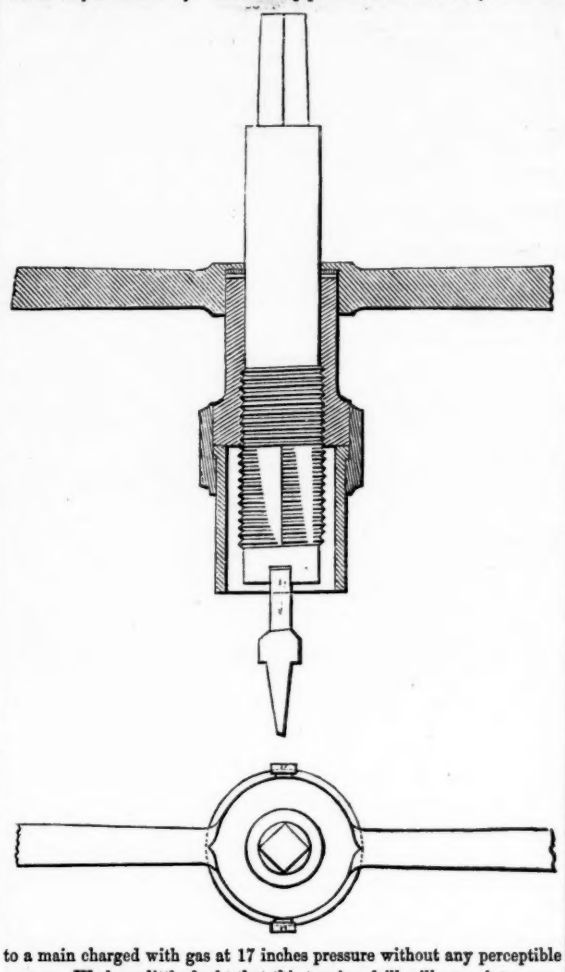
Order for injunction accordingly.

Miscellaneous News.

UPWARD'S TAPPING-DRILL.

The proverb "It is an ill wind that blows nobody any good" seems likely to be verified by the fire in Wood Street, which is alleged to have been caused by an explosion of gas issuing from the Great Central Company's main while a service was being laid on. Mr. Upward, the superintendent of the Chartered Company's works in Brick Lane, it will be remembered, saw the hole in the main, and was blown down by the explosion; and, having had this personal experience of the danger of leaving a large hole in a main open before the service-pipe is connected, he has contrived a very simple and ingenious instrument, by which holes may be bored and service-pipes fixed with the least possible escape of gas. The accompanying diagram represents a section of the apparatus. To one end of the bar a small boring bit is fixed, of the ordinary kind. As soon as a small hole is made in the main by the bit, it is plugged by the advance of the cylindrical stem, and the bar is forced into the main until stopped by the edges of a flat cutter, which is the size of the hole intended to be made. On the same bar, the tap for making a female screw in the hole is also fixed; so that, without removing the tool, the hole is bored and tapped. Previous to the tapping, however, the burr formed by the cutter has to be removed, which is done by partly withdrawing the cutter, the side edges of which smoothen the hole.

To prevent the escape of gas during this part of the operation, the tool works in a cylinder, at the farther end of which there is a stuffing-box, and the opening near the main is closed by means of grease, or by a flexible joint. The only escape of gas that can occur is during the removal of the instrument to introduce the service-pipe, which, if adroitly done, is the work of a second only. Still further to prevent escape through the service-pipe itself, while it is being screwed on, it is stopped by a thin plug or wafer of wax, or other substance easily removed by heat. The ordinary contrivances for turning the bit, the cutter, and the tap, are applied to the end of the rod and to the cylinder, and the instrument works very satisfactorily. A service-pipe has been attached by its means



to a main charged with gas at 17 inches pressure without any perceptible escape. We have little doubt that this tapping-drill will come into general use, and that ere long its adoption will, for the future, be considered one of the "reasonable precautions" against accidents which, as the Lord Chief Justice said, in his recent charge to the jury in the Wood Street fire case, all gas companies are bound to take.

SURREY CONSUMERS GAS COMPANY.

An Extraordinary Meeting of this Company was held at the London Tavern, Bishopsgate Street, on the 31st ult., "to receive and consider the report of the directors, relative to the management of the works on the expiration of the present contract with Mr. Croll." There was a large attendance of shareholders.

The Secretary (Mr. Boddy) having read the advertisement convening the meeting,

The Chairman (Mr. Pocock) said: Gentlemen,—You are convened here to-day upon very important business, and in pursuance of a resolution passed at the meeting of shareholders in October last. That resolution was, in effect, if my memory serves me right, that the directors be requested to mature the plan upon which they intend to carry on the affairs of the company after the expiration of Mr. Croll's lease, and to convene the shareholders, before the end of the year, to hear the nature of that plan. I think that was about the burden of that resolution. I am only sorry, gentlemen, to stand here before you to-day to state that I have no matured plan to lay before you, and that arises out of some very unpleasant circumstances which have taken place at our board ever since the month of August last. I feel to-day that I am in a strange position—such a one as I have never been in before since I have been connected with this gas company. The unpleasant circumstances which I have had to regret arise from the fact that I have had to maintain, at our board meetings, a steady opposition to propositions which have been brought before the directors, relative to Mr. Croll having a fresh lease of the works granted to him; and also two other propositions which have been submitted to us, to the effect that Mr. Croll should have the entire and sole control of this company, and of all its affairs. Those propositions I have felt in my conscience, as an honest man, acting for you as a body of gentlemen who have intrusted me with a great responsibility in relation to your business, I was bound to oppose. During the last ten years, I have felt that responsibility, and have endeavoured, as your representative, to do my duty honestly, faithfully, and conscientiously, and have refused to truckle to any man whatever. Consequently, in taking the course I have now done, I have been obliged to stand in opposition to many gentlemen on the board with whom I have been for many long years on intimate, and what I may almost call friendly terms, and with whom heretofore I have been in the habit of conducting the affairs of this company in good feeling. But there are periods in the history of one's life when we feel we must make a stand even against our best friends, especially when we see those friends treading out of that straightforward

path which we believe would lead to ruin. We are bound, then, to tell them they are going wrong, and if they will not hear our voice, we must part from them, and let them take their own course. We are therefore before you in this state to-day, gentlemen. I have always considered the shareholders, when met in this manner, are the proper tribunal to which all the acts and deeds of the directors ought to be submitted, and I have ever felt it my bounden duty to let you know every matter which appertains to your interest and the prosperity of your company; and it is because of this I have been induced to take the stand I have done since the month of August last. I wish to ask you, gentlemen, therefore, to-day, when the whole of these matters have been brought before you, whether my conduct meets with your approbation or not. If it does not, I beg you will tell me, and I shall then most submissively retire to my quiet comfortable home in peace; but if, on the contrary, when you have heard what will be brought before you, you do approve of my conduct, I am willing, so long as God gives me life, and health and strength, to abide with you, and do all in my power to promote the prosperity and well-being of your company. I stand here to-day upon my trial as it were, and I have to ask you whether you approve of the course I have taken. I have never laid down upon my pillow one night with the reflection that I have taken one single step wrong relative to the interests of the shareholders of this company; but you will be the best judges of my conduct presently. I am sorry that Mr. Croll (I must mention names, but I do it with no bad feeling, —and I hope that I and every gentleman who speaks to-day will endeavour to maintain as quiet a temperament as possible, for I am sure no good result will arise from losing our tempers)—I say I am sorry that Mr. Croll should, nearly eighteen months before his lease expired, have thrown the apple of discord into the board of directors, and thus have caused a complete disunion amongst us. You know the proverb, that "a house divided against itself cannot stand;" and, in the present instance, this disunion has prevented our proceeding to business with any real, profitable results. I feel deeply sorry for this, because there are gentlemen over whom such influence has been brought to bear that they have taken the position of supporting Mr. Croll decidedly through thick and thin in all the matters that have been brought before us. I do think this is a bad principle; and I have to charge those gentlemen with having concocted, unknown to me as their chairman, and unknown to others of the directors, measures cut and dried, to force down our throats whether we would or not. (Shame, shame.) I do not think this is honest conduct on the part of men who are sent there to perform your business in a righteous manner. I like everything to be straightforward; and if I had any measure to bring before the board, I should not go into some corner and concoct it along with the person who is to derive a profit from it without bringing it before the board of directors. No such thing has been done here; every measure brought before the board, relative to this unpleasant affair, has been done unknown to me. First of all, the proposal was made that Mr. Croll should have six months beyond the present lease. There seemed hardly any objection to that; and, when it was made verbally by Mr. Croll, I did not feel in my own mind any opposition; but I told Mr. Croll that the board could not go into the consideration of it that day, as our business was done, and I asked him to put in writing what he required. He said he would; and, on the next board day, he came to me, and said, "Mr. Chairman, I hand you a letter, according to your request, wherein you will find what I require. Perhaps it would be better for me to retire from the room before you discuss the matter; but I have to tell you, before I leave, that I cannot depart one jot or tittle from anything therein contained." I said, "Very well;" and when he was gone out, the letter was opened, and to my surprise, what should it be but a proposal for the extension of his lease to four years and a half beyond the present term, with an offer on his part to pay £2000 a year in addition to what he now pays, without any reference whatever to any increase of rental. So that, if your rental increased to £50,000 or £60,000 a year, you would receive nothing more for it. I can assure you, gentlemen, that I have never contemplated the leasing of the works again, after the expiration of the present contract; and I ground my objection to doing so upon the fact that no other company in the metropolis is leased, and yet they are prospering most abundantly. There is the Imperial, which paid 10 per cent. at their last meeting, and 2 per cent. on account of back dividends; the South Metropolitan, paying 10 per cent., and reducing the price of gas 4d. per 1000; and our neighbours, the Phœnix, paying 8 per cent., and carrying over to a reserve-fund many thousands of pounds. Now, I ask you, gentlemen, why should you part with such an important property as this into the hands of one man? why should he put into his pocket some £5000, or £6000, or £7000 a year, and you not have any benefit from it? I should have been glad if Mr. Croll had just held on with us till the termination of his lease, and then quietly gone away, and been content with the large amount he must have made out of this company. I should not have grudged him one farthing. But why should he now want to put the grasping hand upon the amount of rental which this company should produce, and which I am certain, if managed as it ought to be, under the control of an efficient board of directors, having the best staff they could possibly put their hands upon, and who would be willing faithfully to serve you, it will do? (Hear, hear.) If, instead of being under the control of a single individual, the company is in the hands of an efficient board as all the other companies are, I am certain that at the expiration of Mr. Croll's lease, or in less than two years, you will receive your 10 per cent., which is the largest amount the Act of Parliament will allow you to divide, and that you will be enabled to reduce the price of gas. (Hear, hear.) Now, these are two important matters, which you have to keep in view—first, to get that amount of dividend to which you have a right; and second, to supply your customers with a good article at the lowest price, whereby we may mutually be satisfied—you as the sellers, and they as the buyers of gas. Gentlemen, there is so much that I could go into in reference to this matter, but you will hear it presently read by the secretary, and, therefore, I shall not do so. I have the pleasure to tell you, that at the meeting of the committee appointed to go into Mr. Croll's last proposition, I succeeded in getting a resolution passed which involved a report to the board, and which enables me to bring before you the minutes of all that has taken place since August last; so that you will hear the whole of the circumstances as they have transpired at our several meetings in the board-room; and I think, when you have heard them read, you will be able to decide for yourselves whether the resolution which I proposed, and which was lost, or the amendment which Mr. Duval, on the part of Mr. Croll, proposed, and which was also lost, most deserves your approbation. I have only to say, gentlemen, that I feel exceedingly obliged to you for all your past kindness to me, and if that kindness, and your approbation of my conduct should pass away with this meeting, I shall yet feel deeply sensible that I have discharged my duty for your welfare. (Cheers.) I will now call upon Mr. Boddy to read this paper, which contains the whole of the minutes of what has taken place on this subject since the month of August last.

Mr. KERRY: I think they had better be read from the minute-book.

The SECRETARY: It will save time to read them from the paper.

The CHAIRMAN: I can vouch for its correctness.

After some discussion on the point, the CHAIRMAN said the last act of the board, seeing that they could not agree upon a report to submit to this meeting, was to resolve to lay the whole of their minutes on the subject before the shareholders.

Mr. DUVAL, one of the directors, then moved, and Mr. WHITE, another director, seconded, that the minutes should be read from the minute-book, to which an amendment was moved by Mr BLAKE, and seconded by Mr. PEARCE, that they be read from the extracts prepared by the secretary.

The amendment, on a show of hands, was almost unanimously adopted.

The SECRETARY then read the minutes, from which it appeared that, on the 23rd of August last, Mr. Croll called the attention of the board to his contract, which expires on the 1st of January, 1862, and expressed a desire that its termination should be postponed until the 30th of June following, upon which it was resolved that the directors should be summoned on that day fortnight to consider Mr. Croll's application. On the 6th of September, the board proceeded to the consideration of the subject, when it was resolved that the further consideration be postponed till the next meeting. At the following meeting, on the 13th of September, a letter was read from Mr. Croll, in which he stated that he had already called the attention of the board to the fact that his contract expired at a period when it would be impossible for him to hand over the works in that efficient state of repair in which he should desire them to be; that he should then be in possession of a large stock of materials for gas-making, and probably a large stock of coke, making it difficult, having regard to the carrying on of the works at the same time, to take the accounts between them. To remedy this, he had proposed to continue his lease for six months longer, so as to make it terminable in June—a month in which he could insure, without detriment to the business, leaving only a small stock of coals and other materials, and in which he could hand over the retorts and apparatus in good repair. Mr. Croll stated in his letter that, since making that proposition, he had ascertained that several members of the board were desirous the lease should be extended beyond the period referred to, and he therefore wished to make the following proposition, viz., that the lease should be extended for a further period of four years and a half, which would have the effect of making it terminate in June, 1866; in consideration of which he would, by extra payments to be made to the company, anticipate such an increased rental as would involve an additional payment of £2000 per annum during the extended period. It was then moved and seconded that the offer of Mr. Croll be accepted; whereupon an amendment was proposed, that the consideration of the subject be deferred to the next meeting, and that the directors be summoned for Monday next, at three o'clock in the afternoon, for that purpose. The amendment having been put from the chair, there appeared four in favour and four against it, whereupon the chairman gave his casting vote in its favour. On the 17th of September, the board again proceeded to the consideration of Mr. Croll's last proposition, when it was moved that it be a recommendation from the board to the shareholders, at their next general meeting, to accept Mr. Croll's offer; and such motion having been put from the chair, was negatived—Alderman Wire, and Messrs. White, Duval, and Stephenson Clarke, voting for it; and Messrs. Pocock (chairman), Black, Laughton, Bowditch, and Williamson, against it. On the 29th of November, it was resolved, that a committee, consisting of all the members of the board, be appointed, to consider the resolution passed at the meeting of shareholders in October, and that they be summoned to meet on Monday, the 10th of December, at two o'clock in the afternoon. On the 13th of December, the minutes of that committee were read to the board. They set forth that, the committee having proceeded to the consideration of the subject referred to them, the chairman presented a letter, signed by a large number of shareholders, expressing their opinion that the interests of the company would be best consulted by the directors taking the works into their own hands at the expiration of the present contract with Mr. Croll; and that any further proposition to lease the works should not be entertained. The letter having been read, it was moved by the chairman and seconded by Mr. Black—First, that the board take the entire management of the works into their own hands at the expiration of the present contract with Mr. Croll, and that the several officers and servants who may be appointed shall be under the control and direction of the board; second, that a responsible managing gas engineer be appointed, who shall have the entire management of the works and the appointment of the inferior servants, subject to the approval of the directors; third, that a consulting gas engineer, of established reputation, be appointed, who shall reside within a reasonable distance of the works, and who shall be required to visit the works whenever the resident engineer requires his advice, and at such other times as the directors may deem it necessary. Mr. Duval then presented a letter from Mr. Croll, dated the 10th of December, stating that he was willing to accept the position of managing director of the company after the expiration of the extended contract, on the following conditions—First, that he should not be bound to attend any particular number of the meetings of the directors; second, that he should have the control of all the officers of the company, with the power of deciding the quality and quantity of the materials and goods required for carrying on the business of the company, and, if necessary, to countersign all orders for such goods, &c., such power and control, however, to be at all times subject to the approval of the board; third, that he was willing to accept, not £800 a year, as suggested by the members of the board who had consulted him upon the matter, but the sum of £500 per annum; and, in the event of the shareholders realizing profits equal to the largest dividend allowed by Parliament, the £500 to be increased at the discretion of the directors and shareholders; fourth, that his lease should be extended for six months beyond the expiration of the present term, so as to make it expire in June, 1862, on the same terms as at present. It was then moved by Mr. Duval and seconded by Mr. Bowditch, as an amendment to the chairman's motion, that Mr. Croll's offer be approved by the directors, and recommended to the shareholders for adoption. Such amendment having been put to the meeting, was carried, the numbers being, for the amendment, six; against it, four. The original motion was then put and negatived, the numbers being, for the motion, four; against it, six.

Mr. FRANKLIN: I think we ought to know the names of those who voted each way.

The CHAIRMAN: I think I could furnish them to you from memory afterwards.

The SECRETARY proceeded: It was then resolved that an extraordinary meeting of the shareholders be appointed to be held on Monday, the 31st of December, at the London Tavern. Mr. Croll, being present, signified his intention to withdraw his letter of the 10th instant, and handed in another letter, in which he stated that, a proposition having been made to him to

assume the office of managing director of the company at the expiration of his present lease, he was willing to accede to the proposition on the following terms—First, that, subject to the general superintendence and approval of the board, all the working branches of the concern should be placed under his authority, except the appointment of secretary and collectors, especially the regulating of the supply and description of materials for making gas; second, that his remuneration should be paid by the board after the shareholders of the company had, by the working of the new system of management, realized the largest amount of dividend allowed by Parliament, while the consumers should not be charged for gas at a higher rate than the average charge of the other companies on the same side of the water.

Major BERESFORD: I must ask one question at this stage. There is no explanation given in the minutes why this proposal was made, and why the other was withdrawn?

Mr. CROLL: Will you allow me to say that I stated, when the first proposition was carried by six to four, I had ascertained that there were some members of the board who thought that proposition was not quite acceptable, and so had voted against it. Being desirous that the peace of the board should be maintained, and that every one should be perfectly satisfied, I asked leave to withdraw the first proposition and hand in one, which I stated at the time I expected would meet with the approval of every member of the board. I may also tell you this, that the other gentlemen who had voted for the first proposition expressed the strongest opinion that every member of the board would be satisfied with the other proposition, and were delighted that I had made it.

Major BERESFORD: I wish to know whether any of the six gentlemen who voted for the first proposition had changed their minds, so as to induce Mr. Croll to withdraw it?

The CHAIRMAN: I can tell you the reasons presently.

Mr. CROLL: Not one had altered his mind, or intimated such a thing to me, but the very reverse.

The SECRETARY proceeded with the minutes. It was then resolved that it be referred to a sub-committee, consisting of the chairman, Mr. Virtue, Mr. Duval, Mr. Laughton, and Mr. Black, to consider Mr. Croll's last communication, and to report thereon. At a meeting of the board, held on the 27th of December, this sub-committee reported that, after much anxious consideration of Mr. Croll's proposition, which had been referred to them, they were of opinion that the Act of Parliament precluded the directors from entertaining the present offer, and they submitted that the several matters contained therein should be left open for the full consideration of the shareholders at their meeting, to be held on the 31st inst., when the whole subject would be laid before them. The Board thereupon resolved that the report of the committee should be received, approved, and entered on the minutes.

Mr. NICHOLSON: May I ask Mr. Croll if he has any claims at present upon the company; and, if he has, if he will state them?

Mr. CRANE: I rise to order. I think no inquiry should be made till the minutes are finished.

The CHAIRMAN: They are finished.

Mr. DUVAL: I beg to say they are not finished. The last resolution of the board has not been read, and I should like it done.

The SECRETARY read the following resolution submitted to the board:—"That this board regrets that the Act of Parliament prevents the directors accepting Mr. Croll's offer;" and this motion having been put from the chair, the numbers appeared—for the motion 5, against it 5; whereupon the chairman gave his casting vote against the motion. (Cheers.)

The CHAIRMAN: Gentlemen, the question has been asked by one of the shareholders, whether Mr. Croll has any claims against the company at this time?

Mr. CROLL: You, sir, know as well as anyone that I have relinquished large claims which I might have charged against the company from the commencement of my lease. No one knows it better than yourself. Submit it to anyone, and they will tell you that it is so; but do not suppose that I am to be taken by surprise in answering, without thought or consideration, a question put to me at the moment. Treat me as I ought to be treated. But I say the conduct of the chairman is anything but what it ought to be.

Dr. LIDDELL: I regret that Mr. Croll is not a little more explicit in his answer, for the question was a very simple one. There are rumours that he has many claims against the company, and I am anxious to know whether it is so or not?

Mr. CROLL: I will read one clause in the lease.

Dr. LIDDELL: I understand one claim of Mr. Croll's is for the use of his room; and there are other charges which perhaps will come out by-and-bye. I only rise to express my surprise and regret that a report has not been laid before us by the directors, and that they have not told us they intend to take the management of the works into their own hands. I am sorry that a certain number of those gentlemen have declared, by the course they have adopted, their incapacity to do so; and I presume from what we have heard, that our board of directors is composed of two bodies—one a working body, and the other an ornamental body. I am glad to find, Mr. Chairman, that you belong to the working body; and I need not tell you and this meeting the very high respect which I entertain for you, for I believe you have had the interests of the shareholders most completely at heart. And not only is our chairman respected by us, but his name is highly esteemed in the borough in which he lives; and I am glad to find that he is willing to take the affairs of the company into his hands, and devote his energies and leisure to the promotion of its welfare. On the other hand, I exceedingly regret that he has not been unanimously supported by the board of directors. (Hear, hear.) One of those directors told us on the last occasion that if the board took the management into their hands, the dividends would soon fall to nothing at all—such a high opinion had he of his own talents as a director! You had better, he said, let Mr. Croll have the works; it will save us a vast amount of responsibility and trouble, and we shall only have to go to the board and sign cheques, and receive the amount which you so liberally award us. (A laugh.) For my part, I should feel ashamed to receive any emolument when there was no work done for it. Among other things, I hold in my hand a pamphlet which was sent me a day or two ago, signed "An Old Shareholder," with a text of Scripture ("I speak as unto wise men, judge ye what I say.") as a motto. Now, whenever I find the sacred writings quoted to serve a pecuniary object, I always think it is time to button up my breeches pocket. ("Hear," and a laugh.) I think the person who put forth this pamphlet had not the interest of Mr. Croll at heart, but the very reverse. At the present time, Mr. Croll appoints all the servants of the company, and pays them, and the company are responsible for their acts, although the board of directors have no control over them. Such a state of things, I need not say, is exceedingly unwholesome, and ought not to exist. I am glad to find the contract is about to terminate, and I am glad that there will not be the shadow of a chance, from what I can see of this meeting, of Mr. Croll having the contract for even six months longer. (Hear, hear.)

Mr. CRANE, amidst considerable noise and interruption, attempted to address the meeting; but not a word could be heard amidst the confusion which prevailed for some minutes.

The CHAIRMAN (to Mr. Crane): I do hope you will sit down, and allow Dr. Liddell to proceed; and when he has done, you shall have an opportunity of speaking.

Mr. CRANE: I rose to ask a simple question, not with any intention to prevent a proper discussion; and I am entitled to an answer. (Interruption, and cries of "Turn him out.")

Mr. BLAKE: Gentlemen, will you allow a speaker to put down your chairman? ("No, no," and cheers.)

The CHAIRMAN (to Mr. Crane): I hope you are a gentleman. I tell you you are disturbing the meeting improperly; you have no right to do so. (Hear, hear.)

Mr. CRANE: I want to know——(Interruption.)

A PROPRIETOR: He says there is no motion before the meeting.

The CHAIRMAN: Dr. Liddell has not yet finished, and you do not know that a motion may not grow out of his remarks. I put it to the meeting whether Dr. Liddell shall proceed? ("Hear," and cheers.)

Dr. LIDDELL: I am sorry for this interruption; it almost looks as if intended to prolong the meeting.

The CHAIRMAN: No doubt of it.

Dr. LIDDELL: I wish to draw the attention of the shareholders to one important point in connexion with the Surrey Consumers Gas-Works. I believe the facilities for making gas at those works surpass any other in London; that there are none which can be so economically conducted, especially in reference to the saving of coals. I am informed that we can purchase coals there at a considerably less amount than what the Great Central or the Commercial Companies can do, and they are only charging 4s. per 1000 for gas. Such are the facilities of our works, that a large profit may be made out of coals alone, owing to the opportunity we have of obtaining them so readily. I wish the whole of the shareholders to bear that in mind, because it is an important element in the further consideration of the matter. I do hope that everything done at this meeting will be done in a calm and quiet manner, and that we shall have no finding fault with individuals. We come here as men of business, to do business, and I hope Mr. Croll will deeply consider the importance to himself and to this company of our being able, as I hope we shall do, to come to some amicable arrangement with him. (Hear, hear.) I am prepared myself, on my own responsibility—how far my fellow-shareholders will support me I do not know—to offer to Mr. Croll a considerable amount of money if he will relinquish the works at Midsummer next. (No, no.) I am prepared to do it, and I think if we could come to some settlement of the sort, it would be highly beneficial to himself, and I am quite certain it would be to this company. (No, no.) I was told that some such proposition had been made to him, and I merely threw it out to save time.

Mr. CROLL: Allow me to say, in order to save the time of the meeting, that I shall fulful my contract to the letter, and I shall not give up the works till the last moment. I think it right to fulfil my engagement.

Dr. LIDDELL: Perhaps, Mr. Croll will state whether he has any claim against the company?

Mr. CROLL: I can only repeat what I said before.

Mr. MAUGHAN: I am sure it is the opinion of the shareholders that the gentlemen at the board are actuated by the best intentions, but it may not always be that they act with the greatest judgment. There is one matter in connexion with Mr. Croll's contract which it is important we should understand. Does the lease make any provision that the gasholders and retorts shall be kept up?

The CHAIRMAN: That he should leave them in proper repair?

Mr. MAUGHAN: Suppose some bad feeling should rise up amongst us, which is not unlikely, from what I see going on, and that we should get to cross-purposes with Mr. Croll, how shall we stand on the 1st of January, 1862, when the works are given up to us. You say the retorts and gasholders are to be left in good repair, but are they to be left full of gas? Suppose the contract terminates at twelve o'clock at night on the 31st of December, is Mr. Croll under any obligation to keep the gas up for the supply of the consumers, or may he take an awkward course, and exhaust the gasholders and retorts, and leave us in darkness? Does the lease make any provision for that?

The CHAIRMAN: I think you are anticipating what is not at all likely to transpire. Surely, no man who has any degree of honour or honesty about him would allow us to be put in darkness in a moment, because his contract does not compel him, after twelve o'clock on a certain day, to have anything to do with the works. I hope Mr. Croll will come to a proper understanding with the directors as to providing against such an emergency, and for taking possession of the works. I should be sorry to find in Mr. Croll the disposition to say, "I am determined to serve you out," although I am averse to his having any further lease with those enormous powers which some gentlemen seek to thrust upon him.

Mr. CROLL: Allow me to answer that. I fulfil all the conditions of the lease, provided I hand over the gasholders and other things in a fair state of repair, without a single foot of gas in the gasholders or in the retorts; and, if I am to be twitted and talked to in the way which Mr. Pocock has done lately, I shall certainly consider it my duty to fulfil the conditions of that lease.

The CHAIRMAN: I call for an explanation of that which Mr. Croll has stated.

Mr. CROLL: I say that you have misrepresented what has taken place over and over again.

The CHAIRMAN: When?

Mr. CROLL: You have since you came into the room.

Mr. MAUGHAN: I was induced to make the inquiry from a remark which I had heard. It appears to me to be a great omission in the contract that such a matter was not anticipated and provided for. I have had some experience in the leasing of gas-works, and I think it ought to have been seen to—otherwise, it puts us very much in the power of Mr. Croll; and I mention it, that the shareholders may understand something of the position they are in.

Mr. DUVAL: I think that is a most important question; and, as I see the solicitor in the room who prepared the contract, I will ask him to give an answer to it.

Mr. JAMES: Probably I know as much of the affairs of this company, up to 1858, as any gentleman sitting at the table. I was the solicitor of the company originally; and, upon my retiring from the profession in 1857, the shareholders did me the honour to elect me to a vacant seat in the direction. I continued a director of the company nearly twelve months, when I

resigned my seat into the hands of the shareholders, who nominated Alderman Wire as my successor. I certainly intended—and so I have acted—when I resigned my seat at the board, never to appear here again; and I only attend now at the request of some of the shareholders who were in the company from the beginning, and who appealed to me to come here and give you my advice to-day as to what you ought to do in the present juncture. I shall do so fearlessly. (Hear, hear.) The scene which we have witnessed since we have been in this room must have given every man of proper feeling great pain. I certainly cannot say that when I left the board I had not a strong anticipation of such a result. I saw there scenes which would have prevented any man of proper feeling remaining at it. It was a complete bear-garden, and there was nothing like business in it. I am sorry to find that that state of things has continued up to the present time, and I certainly think some alteration ought now to be made in your direction. Let me, first of all, just refer to the proceedings of the board in reference to this meeting. We are brought here to consider a report, and there is no report presented. The directors seem to be perfectly paralyzed. Recollect, I am speaking of the directors collectively; there are gentlemen at that board for whom I entertain great respect. But recollect there are influences brought to bear, and there are circumstances brought to bear—they know as well as I do what they are—which prevent them doing their duty. I told you I was nominated by the shareholders, and Alderman Wire was nominated by them, and every one who knew the alderman respected his character—no one more than I. When Alderman Wire died, one would have supposed the directors would offer the appointment to the shareholders; but a gentleman fills his seat to-day who I see for the first time. Do not understand from anything I say that I impugn his character for respectability; he has nothing to do with it; but, I ask, is it fair for the board, who have received the confidence of the shareholders, and who have been paid by them freely for the services rendered, to fill up the appointment, not from among those of the proprietors who have been in the company from the commencement, but by a gentleman who, I believe—if I am wrong, I shall be corrected—was made a shareholder, and qualified for the purpose of the appointment. If I am wrong, pray correct me; but I am informed that some of the directors transferred their shares for the purpose of qualifying him. At all events, if wrong in that, I am right in this—that, having been connected with this company so long, I never saw Mr. Carter here before, and therefore it is not an unfair complaint among the shareholders that they have been improperly used. I am a shareholder in other companies, and I know that, when there is a vacancy at the board, the greatest possible care is taken to select that proprietor who has taken the greatest interest in the company, and who the shareholders think will protect their interests. But, when I find what has been done here, I have a right to consider there was some reason for its being done. What do we hear to-day? Why, that Mr. Carter was one of those who voted for the four years and a half additional term to Mr. Croll, and also for his being made the managing director upon terms which appear to be most extraordinary. Now, as regards the pamphlet of "An Old Shareholder," I cannot help thinking the writer is no shareholder at all, but, if he is, I hope he will declare himself now, for I shall be glad of his assistance in the present suggestion I am going to make. ("There he is behind the table, facing you.")

Mr. BLAKE: There is no doubt about the paternity.

Mr. JAMES: The proposal I am about to make, and the advice I give you is, that you should appoint a committee of shareholders to make an inquiry into the affairs of the company, and confer and consult with the directors in order to mature some plan for the future working of the company. (Cheers.) I prejudge no man, and I do not wish that this meeting should, without inquiry, come to any decision upon this subject; but I do not see that we can come to any other conclusion than to adjourn this meeting to the next general meeting. There is no hurry, as Mr. Croll's contract does not terminate till the end of the year. We may, therefore, adjourn this meeting till March or April, and in the meantime appoint an influential committee, so respectable and numerous that they shall insure to us that the inquiry shall be legitimately and honestly entered into, as to what is the state and position of the company, and what course should be pursued in the future. (Hear, hear.)

Mr. FRANKLIN: I am sorry to interrupt Mr. James, but an inquiry has been made respecting Mr. Croll's lease. I think we had better hear the answer to that first, and then Mr. James's plan can be discussed. I quite agree in all that he has said hitherto.

Mr. JAMES: I will do all I can to prevent in any possible way this inquiry degenerating into a persecution either against the board or Mr. Croll. My sole view is, that I think we ought to know what are the facts. The board are paralyzed, and cannot conduct our business in the way it ought to be conducted. My resolution is—"That this meeting be adjourned until the next general half-yearly meeting, to be held in the month of March or April next, and that a committee of shareholders be and is hereby appointed to confer and consult with the directors, to inquire into the position and management of the company, and to mature some plan for its proper management on the termination of Mr. Croll's contract, with power to call for all books, papers, and documents, to take evidence, and to obtain such professional assistance as the committee may think necessary, and report thereon to the adjourned meeting, and that such committee consist of Messrs. Rigg, Nicholson, Newman, Kerry, Liddell, Strachan, Blake, Brickhill, James, and Major Beresford—five to form a quorum. (Hear, hear.)

Mr. CROLL: Perhaps you will allow me to say I heartily approve of your suggestion, and of the names you have selected.

Mr. MAUGHAN: I second the resolution, as it is only an anticipation of what I was thinking of proposing.

Mr. BLAKE: I rose for the purpose of seconding the resolution. I am quite sure that every gentleman here present will coincide with me that a more unvarnished and simple statement than that which has been laid before the proprietors by the chairman was never yet addressed to an intelligent public meeting. (Hear, hear.) It bears upon it, and throughout it, the aspect of simple truth, and upon that statement alone, had I heard nothing else, would I have relied for the necessity of the motion which has been so eloquently proposed by Mr. James for our adoption. As the chairman very truly said, "A house divided against itself cannot stand." I am sure there is no reason whatever why, in mercantile public bodies, there should ever be anything like the exhibition now presented to us in this company. In companies not mercantile, but political, we can easily understand the existence of party feeling; but, in companies purely mercantile, which have nothing to look at but the business aspect of affairs, and the conducting of its operations honourably for the best interests of the shareholders, I cannot understand how it is possible that, not for days, but for weeks and months, a board of directors can be divided, and so equally balanced that it depends upon the patriotism and independence of the chairman himself to see that the interests of the shareholders are properly protected. Mr. Croll rose, in the course of the present proceedings, and intimated indirectly the possibility that he may have some claims against this company; and he did it in his clever manner, making it to depend upon the issue of the report of the proposed commitee. Does Mr. Croll forget that, within a period of two years, I asked him categorically to answer the question whether he had any claims against the company independently of those which were periodically settled with him, and that the answer which he gave me at the Bridge House Hotel was in these very terms, which Major Beresford made a note of at the time—"I unhesitatingly pledge myself that I have no claims against the company."

Mr. CROLL: Allow me to say, Mr. Blake, that I was perfectly sincere; it was perfectly truthful; and I repeated the same thing at a later date. But, though I have relinquished certain things, that is no reason why they should not be charged for the future. But the committee will go into this, and see what are the rights between man and man. I am delighted that Mr. Blake is one of the committee. I am satisfied with that committee, and I hope you will allow them to judge without going into the matter now.

Mr. BLAKE: It is very inconvenient to interrupt a speaker in the middle of his speech, but I am glad you do not ignore what was said. One thing does surprise me, and that is, the eagerness of Mr. Croll to obtain this contract, for it must be in the recollection of all the shareholders who now hear me, that at no distant day he came forward and unhesitatingly stated that he had no intention to apply for a renewal of that contract, and he did it in most decided and distinct terms. Has this gentleman altered his mind since then? Has this grown up as a new desire, or was that affected indifference assumed to cover the anxiety which he cannot now conceal or control to get possession of the contract? The reason is obvious to all who will look at our balance-sheet. Any one "who runs may read;" and I can put it before you in the simplest form, in two minutes, why Mr. Croll desires to renew the contract. To do so on the terms proposed by him, would be to throw away the profits of the company in the most wanton and extravagant manner possible. I will only ask you to remember that our rental is now £43,652. 17s. 5d.; but I will throw over all the amount above £42,000, which will be so much in Mr. Croll's favour—*i. e.*, I simply take the amount upon which Mr. Croll pays us. At Christmas, 1859, the amount due and payable by Mr. Croll to us for rental was £4775, and for interest upon sums expended for works extension, £2798. 4s. 10d. The rent to Midsummer, 1860, was £5675, and interest on works extension £2944. 19s. 6d., making a total of £16,195. 4s. 4d. Now, that represents such a portion of the £42,000 as would be equal to 7-18ths of 4s. 6d.; for you will understand that the £42,000 is virtually an aggregate of so many 4s. 6d.

Mr. CROLL: These is no such a price.

Mr. BLAKE: If you take this £16,195, which, as I say, is 7-18ths of the total sum, out of that the whole of the dividends to the shareholders have to be paid, the allowances to directors, the paving and other charges, and a by no means contemptible sum is carried over to our revenue account. The next consideration is the cost of gas, a question which is well understood, in consequence of the litigation of Mr. Croll with the Central Company. We know that the expense at the consumer's meter, including all extra illuminating power, may be put down at 1s. 9d. per 1000 feet, so that the proportion paid for that £16,195 is £6719, leaving £9476, out of which Mr. Croll has only to pay the costs of his collectors, and other expenditure of that kind. Putting that down at £4700, it leaves him in the enjoyment of £5000 a year out of his contract at the present moment. This is clear profit, and I unhesitatingly challenge him to disprove the statement that he does not get that amount.

Mr. CROLL: I am ready to deny it now. I do not say what profit I have had, but I do say there is only 4s. 3d. per 1000 got for the gas.

Mr. BLAKE: The very eagerness of this gentleman to give us £2000 a year more than he has hitherto done proves that there is something more than that to be got out of the contract; and I will pledge my credit, if figures are to be understood at all, that that man gets £5000 a year out of the contract at the present moment. And, gentlemen, it is more than that. I have taken a very moderate figure, for I have excluded the profit on gas made at 1s. 9d., which he always professed, in his dealings with another company, he should be amply satisfied with. This, with other matters, will be an important subject for the consideration of the committee; and, at all events, they are so important as to justify your supporting the proposition of Mr. James, that such an inquiry should be made. Otherwise, you will be placing yourselves blindly in the hands of a man whose temper to-day clearly proves that he will have no mercy upon us if we do.

Mr. CROLL: Mr. Blake is reasoning upon no principle at all. It is true the charge for gas to private consumers is 4s. 6d.; but the supply to the railways and the public lamps brings the price down to an average of only 4s. 3d. per 1000. I do not wish to lead you to suppose that I have made no profit. I do not tell you what I have made. I may very likely have made more than £5000 a year.

Mr. BLAKE: Supposing it were possible to consent to the proposition of Mr. Croll, and that we should give him the entire control of all the works and let him pay us our dividends, I will ask any reasonable man what necessity there would be for a board of directors, with an allowance of £1000 a year, for merely receiving a cheque from Mr. Croll? The proposition is monstrous—perfectly monstrous. But, apart from that, Mr. Croll ought to be better informed as to what we can do, and what we cannot do. You must recollect that our affairs are regulated not only by our private Act, but by the Companies Clauses Act, the 85th clause of which provides—"No person holding an office or place of trust or profit under the company or interested in any contract with the company, shall be capable of being a director, and no director shall be capable of accepting any other office or place of trust or profit under the company, or of being interested in any contract with the company during the time he shall be a director." The next clause says: "If any of the directors, at any time subsequently to his election, accept or continue to hold any other office or place of profit or trust under the company, or be directly or indirectly concerned in any contract with the company, or participate in any manner in the profits of any work to be done by the company, then, and in any of the cases aforesaid, the office of such director shall become vacant, and thenceforth he shall cease from voting or acting as a director." And yet Mr. Croll would, notwithstanding this, wish to violate the terms of an Act of Parliament, and be not only a director but "the managing director." (Hear, hear.) I would just, in passing, refer to the letter from "An Old Shareholder." We know that, a short time ago, Mr. Croll published a letter to the shareholders of another company very much in the same shape: and, as a quotation from that letter appears in this, we cannot have much doubt as to the paternity. I can very well understand why it is anonymous. Any person would be ashamed or afraid to put his hand to such a publication, because it is absolutely libellous. At page 17 of the pamphlet, the writer says: "The large falling-off which has occurred in

the case of the Great Central Gas Company from the period of Mr. Croll's retirement furnishes experience to us at the present time which it would be the greatest imprudence on our part to disregard." Now, so far from that being the case, this is a portion of the last report of the directors of the Great Central Company to their shareholders:—"Gentlemen,—The directors beg to submit for your consideration the balance-sheet for the half year ending 30th June last, together with the results of cost of manufacture and distribution for the same period. From this statement it will be seen that, after paying all the ordinary working and manufacturing charges, and carrying forward an amount of £3474. 5s. to the wear and tear account, there will remain in hand the sum of £5999. 12s. 10d. applicable for the payment of dividend, out of which the directors recommend that a dividend at the rate of 6 per cent. per annum, free of income-tax, be declared." So that they were absolutely steadily progressing, notwithstanding the enormous expense in which the award to Mr. Croll under the arbitration had involved them. Mr. Croll twits them with their shares being at £8 instead of £12. 10s., which they were at the termination of his contract. But who is the cause of that? Why that gentleman himself. Did not he keep back claims, and never allow them to be ventilated? He allowed no one to know of them, but concealed them in his own breast until he had disposed of the whole of his 1500 shares, at a profit of £5000, and then he let the world know that he had claims against the company, and the men to whom he had sold his shares he made liable for the consequences, and the depreciation of their shares. That is the man you have to deal with at the present moment, and therefore it behoves you to be very careful how you make any arrangement with him.

Mr. CROLL: I wish to say that I am perfectly well aware that Mr. Blake can speak in a manner which will be satisfactory to a certain number of persons present. There are a large number of the shareholders of the Central here. There is the secretary and several other officers of that company present. I do not know for what purpose, but they have been very active in applauding Mr. Blake's speech. Allow me to say that, with regard to the claims I had upon that company, it is not true that I kept them back. The principal claim I had was for increased illuminating power; and it was only because the surplus dividend was not declared, during the time that I was with the company, it was not brought forward. But the chairman stated before the arbitrators that an account of it was kept, and the details entered into from time to time. As regards the position that the Central Company are in, I think I was perfectly justified in drawing the conclusion I did. It is quite certain they had a certain surplus, after paying 8 per cent; and it is perfectly true that while I was with them they paid 8 per cent., and had something like £12,000 over, and during that time their rental increased 10 per cent. These are facts.

Mr. KERRY: I have listened very patiently and attentively to the observations from Mr. Croll and the other gentlemen, and I cannot permit this opportunity to pass without expressing my deep regret that so much acrimony has been introduced into the discussion. It seems to me that we have met upon a business matter which is within the compass of a child's apprehension. The object of the resolution at the last meeting having failed, Mr. James has proposed another which I expect will be carried by acclamation. I would simply ask one question of Mr. Croll, and then refer to a question which was proposed by another gentleman, and ask Mr. James to answer it. I was much delighted to hear Mr. Croll say that he cordially approved of the plan proposed by that gentleman, and I would ask him, whether he will have any objection to be bound by letter to such a decision as the committee of shareholders may come to, so that this painful discussion may not be repeated?

Mr. CROLL: Surely, you cannot ask me such a thing; it is absurd. Under the circumstances in which I am placed, do you think I can place myself in the hands of Mr. Blake, a man who has displayed such a temper as he did just now? It is absurd.

Mr. KERRY: I take that to be your answer. Then, I would ask Mr. James kindly to address his mind to the great question mooted previously as to our position on the 1st of January, 1862. It has been intimated by one of the speakers that it is in the power of Mr. Croll to leave us with empty gasholders and empty retorts at that time, which would create an immense amount of inconvenience and disaster. In fact, it is impossible to conceive the inconvenience and injury that would ensue; and, though I am not a consumer on the Surrey side of the water, I should like to know how far it is likely that we may be left in that predicament.

Mr. JAMES: It is now three years since I saw the contract, and I hardly expected to be called upon to answer such a question to-day. As regards this point, I am sorry to hear Mr. Croll make a threat; but we have courts of justice and courts of chancery, and if we understand that what he says is a threat which he intends to carry out——

Mr. CROLL: I did not say that for one moment. (Cries of "You did.")

Mr. JAMES: I beg your pardon; I understood you to say it. (Hear, hear.)

Mr. CROLL: What I said was simply this that, without going into any point in the lease, if I was to be treated in the way in which there was an attempt to treat me, I should take care to fulfil every condition in the lease.

Mr. JAMES: That must mean, that you will, at the termination of your lease, hand over the gasholders in a condition to light the district.

Mr. CROLL: I will take care, Mr. James, to give no answer just now.

Mr. JAMES: I can only say that it will be one of the duties of the committee of inquiry to look into this matter; and if Mr. Croll, upon reflection, does not alter his mind, the committee will take the best legal advice upon the subject, so that the public are not inconvenienced.

Mr. CROLL: My strongest and most anxious desire is to do everything I can for the company, and to leave them in the best position. That is my strong desire, and it has been evinced on every opportunity. I defy any person to say that I have not on all occasions made sacrifices, and rather placed myself in the hands of the directors. It has been stated by Mr. Blake, that I had the control of all the servants, and that I engaged them. In every case, I have told those servants, and they have been talked to by the directors as though they were in their employ, and I have at all times encouraged that idea.

Mr. NICHOLSON: I am exceedingly glad to hear the statement of Mr. Croll, that he approves of the step which the meeting is about so take in appointing a committee to act in concert with the directors, and that he will meet that committee to confer with them on such matters as fairly come within their province. Moreover, I believe that he will carry out his contract without throwing any unreasonable obstruction in the way of the company at its conclusion. Under these circumstances, I consider it desirable that Mr. Croll should answer me one question, as I have been nominated on that committee, and it is this—Will Mr. Croll meet the committee, together with the directors, in the course of the next three months, and discuss dispassionately and considerately these matters, with a view to the reconciliation of all points of difference that exist between the company and himself, so that there shall not be left a single contingency to be contemplated at the time when his contract terminates, and we take the works out of his hands?

Mr. CROLL: With the greatest possible pleasure.

Mr. NICHOLSON: Then, gentlemen, I think we are bringing this meeting, which commenced in a stormy and turbulent manner, to a satisfactory conclusion.

Mr. CROLL: Allow me to say one word. Of course, I cannot but suppose there are some friends of mine on the committee, but we have certainly seen such a display this afternoon as to cause me to think some of them are not my particular friends. I would therefore merely say, that I will meet them with the greatest possible pleasure at any time they choose to meet; but I should like it to be understood that these meetings are not to be held without my knowing it, and having the power to be present.

Mr. NICHOLSON: Certainly not. I am quite sure, for myself and Mr. James, and I believe I may speak for every gentleman nominated on that committee, there shall be no unfair play. (Hear, hear.) We meet to bring these questions to an amicable settlement. As to the gasholders being left without gas on the last day of this year, I do not think it possible. Mr. Croll has a character at stake in the City, and he could not afterwards hold up his head if he did such a thing. Neither did he do so in the case of the Great Central Company, in which I am a shareholder, and there were then more serious difficulties in the way than can possibly exist twelve months hence between this company and Mr. Croll; therefore, it is not to be at all contemplated that such a contingency can possibly arise. (Hear, hear.)

Mr. CROLL: I would suggest to Mr. James that, before the resolution is submitted to the meeting by the chairman, there should be inserted words to the effect that the committee meet me to settle any differences which may exist between the company and myself.

Mr. BLAKE: That is, all matters.

Mr. NICHOLSON: No, it is not all matters. This committee are going armed with power, and it is better to let those powers be specified.

Major BERESFORD: I wish to put a question to Mr. Croll—Will Mr. Croll allow the committee to go upon the works at any reasonable time?

Mr. CROLL: Certainly not.

Major BERESFORD: On no occasion?

Mr. CROLL: What do you mean by "no occasion?" Why put that to me? How absurd to ask me anything of that kind! Have I ever acted in that way? I have told Mr. James I am pleased the committee is appointed.

Major BERESFORD: Do you exclude the committee from the works?

Mr. CROLL: How absurd to ask me! I am not the committee.

The CHAIRMAN: I think the meeting should be in possession of the fact, with reference to the question of Major Beresford that, in October last, on the occasion of the meeting of shareholders, Mr. Croll came to the directors in the adjoining room and said, "Mr. Chairman and gentlemen, I have something important to communicate to you. I have to declare to you this day" (and he had done it before) "that I shall avail myself of the privilege of my lease, and not allow any one to go on the works, unless he gives me twenty-four hours notice." And he gave this as a reason—that some director or directors had been on the works, and asked questions of his managing man relative to the manufacture of gas. He told us he must have all questions relating to the manufacture and carrying on the affairs of the company go through him; consequently, I think the Major has asked a very proper question, as to whether the committee will be allowed to go on the works without giving twenty-four hours notice.

Mr. CROLL: Allow me just to answer the chairman. This is one of the things that I have, unfortunately, had to complain of before—the making of statements which may be partly true, but which convey a different impression to the right one to your minds. The circumstances were simply these:—In the first place, when one of these questions was to be discussed, the chairman told me they were going to do it on a particular day, and I said it would be impossible for me to be present, and the chairman promised that Mr. Boddy should communicate the result to me. At the meeting down stairs, ten days afterwards, no communication having been made to me, I said to the chairman, "I certainly think, in a matter of so much importance to me, you should have done so, especially as you volunteered to send to me." He said he had never done anything of the sort, but he was made to remember it by an appeal to the other members of the board.

The CHAIRMAN: On the contrary, I appealed to the members, and they did not remember anything of the sort. [Mr. Duval and Mr. Laughton being again appealed to, said it was quite true.] Your own friends say so.

Mr. DUVAL: I think you said that Mr. Boddy should communicate, and he forgot it.

After some remarks by Messrs. BLACK and LAUGHTON on the subject, and considerable interruption in the meeting,

Mr. CROLL said: There is another point. The chairman says that I refused to allow any one to go upon the works. The facts are these: I have said, from first to last, that I was ready at all times to give them any information in my power, and they never asked for a reasonable item but it was communicated to them, although it might relate to my private concerns in manufacturing or anything else. But I said, if a director chose to adopt the course of clandestinely going to look into my private ledger to such an extent that the clerk had to shut it in his face—that if he persisted in such a course, I would require the twenty-four hours notice before allowing them to go over the works. How different is the statement of the chairman!

The CHAIRMAN: The statement made by Mr. Croll is not true. (Interruption.)

Mr. BLACK: Allusion has been made to me. As far as looking at his ledger or coke sale-book, I think I asked the price of coke, and whether he got a good sale for it, and said that I was pleased to see the yard so clear of it. I might have asked, knowing what quantity of gas was got out of similar coal at another place, how much they made here under corresponding circumstances. Beyond that, I never saw the ledger in my life. As to the account of the carbonizing, I remember the clerk did shut up the book when I was looking at it, but I thought it too trivial a thing to notice.

Major BERESFORD: I put the question to Mr. Croll, will the committee appointed to-day be allowed to go on the works? I understood him to say flatly, "No;" but the gentlemen opposite say he assented.

Mr. CROLL: I clearly and distinctly said I was willing to meet the committee, whether at the works or any where else. Mr. Nicholson has promised, and I trust the committee will allow me to attend every meeting, and that everything will be done fairly and honestly. With that I am perfectly content.

Major BERESFORD: I want to know whether you will object to that committee being accompanied from time time by any competent engineer they may take with them?

Mr. BLAKE: The resolution carries that.

Mr. KERRY: How can the committee do their duty without they go upon the works?

Major BERESFORD: I do not want, when the committee are appointed, and go down to the works, for the door to be shut in our faces.

Mr. CROLL: You have the power in the lease.

The CHAIRMAN: Mr. James, I believe there is no difficulty about that?

Mr. JAMES: The directors have the power.

Mr. CROLL: If Mr. Nicholson will intimate at any time—I put myself entirely in his hands—that he wishes to go into the works, and take anyone with him, I will attend, and anybody shall be admitted that he chooses. (Hear, hear.)

Mr. CARTER: Allusion has been made by Mr. James to my having become a shareholder, in order to be made a director. I became a shareholder in 1855. Will that satisfy you?

Mr. NICHOLSON: Had you sufficient qualification when nominated?

Mr. CARTER: Yes.

Mr. NICHOLSON: Had you a sufficient number of shares, or were any transferred to you?

Mr. CARTER: I never had any shares transferred to me by any one. (Hear, hear.)

Mr. DUVAL: I beg to say that Mr. Carter was nominated at the time Alderman Wire was elected; and it was an understanding that he should be considered at the next vacancy.

Mr. JAMES: I regret having made the allusion.

Mr. CARTER: I hold 150 shares.

The CHAIRMAN then put the motion, which had been altered by Mr. James as follows: "That the meeting be adjourned until the next general half-yearly meeting, to be held in the month of March or April next, and that a committee of shareholders be hereby appointed to confer and consult with the directors on the present juncture, in the meantime, as the committee may think necessary, to inquire into the position and management of the company, and to mature some plan for its proper management after the termination of the contract with Mr. Croll, with power to call for all books, papers, and documents, to take evidence, and obtain such professional assistance as the committee may think necessary, and to meet Mr. Croll, and arrange with him for the giving up of the works at the termination of his contract upon such terms as may be, in their opinion, necessary."

Mr. CROLL: I am afraid lest there should be any misunderstanding. Of course, that does not mean that you are going to inquire for my books?

Mr. JAMES: I only mean those which are in the power of the directors.

Mr. CROLL: I do not wish to be misunderstood. Neither do you ask to go into the present management of the company, so far as my management consists.

Mr. JAMES: So far as your office is concerned, we have no power unless you allow it.

The motion was then put, and carried unanimously.

Major BERESFORD: Gentlemen, before we separate, I am sure you will gladly respond to a vote of thanks to the chairman. In making that motion, I only trust you will not on any future occasion ignore the respectability and responsibility which belong to his name, or fling to the winds, through any statements you may hear, that security which the bulk of us feel in having him at our head. I hope he will long continue to fill that post; and I am sure, if we stick to him, we shall be safe. (Hear, hear.)

Mr. FRANKLIN seconded the motion.

Mr. BLAKE: I think we may make some addition to this motion without deteriorating from its value to the chairman. I feel that we owe a great deal to the gentlemen at the board who have given him their hearty support, and therefore I wish to include in this vote the names of those gentlemen who have acted with him.

Mr. MAUGHAN: I think it is to be regretted that gentlemen who have been appointed on the committee should show so much bias and evidence of a foregone conclusion. It would be better to repress their feelings, and go into the consideration of the question with their minds less prejudiced than is exhibited in such a display.

Mr. BLAKE (with much warmth): This is a speech to me. If I had not felt as strongly, and expressed myself as strongly, on the present occasion, and had not gentlemen on the board expressed themselves as strongly as I do, the whole board would have been pledged to a course of conduct, in reference to the contract, from which the gentleman who has just spoken, with all his ability, would not have been able to extricate us. I speak warmly, because I feel strongly, but I am not therefore a passionate man.

Mr. DUVAL: Mr. Blake would convey to your minds, by the addition to the resolution proposed, that the gentlemen who have voted against the chairman wanted to sacrifice your interests, and ruin the company. I wish to impress upon your minds that they desired to do nothing contrary to your interests, and their resolution amounted only to a recommendation to the shareholders. Surely, because one man differs from another on a board of directors, he is not to be condemned for it. If five voted one way and five another, do not pass a vote of thanks to the one party because they voted with the chairman. It is unjust and uncalled for. Not that I want Mr. Blake's thanks; I would rather have the thanks of gentlemen who stand higher in my opinion than he does.

The motion was then put and carried.

The CHAIRMAN: Gentlemen, I am sorry you cannot include Mr. Duval in the vote as well as the other gentlemen. I have abstained to-day from many remarks which I know would hurt the feelings of those gentlemen. Mr. White, last Thursday, made a remark which was quite derogatory to me as chairman, and, therefore, I am not surprised that Mr. Blake should thus distinguish the vote in the way it has been done. I can only say I shall never court the smiles nor fear the frowns of any man. I shall endeavour to maintain that character which I have maintained in the borough of Southwark for three score years, to the end of the chapter—that is, a straightforward, honest, upright mode of dealing, whether in the private circle or in any public duty which I may have to perform for you or any other part of the community. I feel deeply grateful for this mark of your approbation; from that I perceive that you do fully concur in all that I have done in the course I have taken relative to this matter; and I shall more than ever feel that I am bound up with you to go forward and endeavour by all the means in my power to secure that prosperity which your company cannot fail—I put it positively—to obtain, if managed by a properly constituted board of directors. (Cheers.)

Mr. WHITE: Gentlemen, the chairman has thought proper to mention my name without giving any explanation of what he refers to. [Interruption, during which the chairman left his place.] I wish to ask him what he alludes to.

The CHAIRMAN had by this time left the room, and the meeting then separated.

DESCRIPTION OF A "GAS-PROVER," OR INSTRUMENT FOR ASCERTAINING THE QUALITY OF GAS.

By Professor ERDMANN, of Leipzig.

(From *Erdmann and Werther's Journal für Prakt. Chemie.*)

(*Continued from page* 11.)

The experiments which I have made with light carburetted hydrogen or marsh gas are particularly interesting. Decarburetted gas—or a slightly luminiferous mixture of illuminating marsh gas with hydrogen—requires more air for the complete destruction of its illuminating power than a mixture of olefiant gas* and hydrogen of the same illuminating power. Such a gas shows 22°, which would correspond with a mixture of hydrogen with 18 per cent. olefiant gas; but its illuminating power was shown, by photometrical test, to be much less than that of the last mixture. Pure marsh gas, obtained by heating acetate of soda and chalk, burns in the "gas-prover" with a flame the form of which is not exactly defined, and on which, after the opening of the slit in the apparatus, the last disappearance of the white light over the scarcely distinguished inner cone is very difficult to observe. The result attained by many observations gave 26°; this would correspond with a mixture of 20 per cent. olefiant gas with 80 per cent. hydrogen. The illuminating power of a mixture of 20 per cent. olefiant gas with 80 per cent. hydrogen is, according to my experiments, at least thirteen times greater than that of the marsh gas, although the latter possesses the per centage compound of a mixture of equal portions of hydrogen and olefiant gas.

Illuminating gas mixed with marsh gas gave results which agree with the calculated table, viz.—

	Ascertained Result.	Calculated.
90 per cent. illuminating gas of 35° with 10 per cent. marsh gas,	34·1°	34·°
80 " " " 39° " 20 " "	38°	37·°

From these experiments, it follows that it is impossible to compare the illuminating power of different gases, as exhibited by the gas-prover, with the same per centage of olefiant gas; for 100 of marsh gas would, according to the gas-prover, be only equal to 22 olefiant gas; accordingly, 30 per cent. of the same would be equal to 6·5 per cent., and in illuminating power only equal to 0·5° of olefiant gas.

According to this, the gas-prover can only serve to decide the relative value of different illuminating gases. Even in this the marsh gas causes an error which, however, can in any event be but a trifling one, as may be easily shown.

If the analyses of the illuminating gases from pit coal, executed according to reliable methods, be compared, it will be found that the marsh gas contained therein varies from 35 per cent. to 45 per cent. By means of Frankland's† numerous analyses of illuminating gases from the most different English pit coals ‡ (apart from the hydrogen gases), and further from Landolt's analyses of the Heidelberg gas §, as well as from Wunder's analyses of the Chemnitz gas—by means, therefore, of analyses which embrace gases of the most different qualities, from the most valuable to the very inferior ones—an average amount of 40 per cent. of marsh gas in pit coal gases ‖ is obtained. If, therefore, 40 per cent. be assumed as the normal quantity, then the error in the valuation of an illuminating gas, caused by contaminating a greater or less amount of marsh gas, cannot be of much importance. If, for example, a gas contained 50 per cent. marsh gas—consequently 10 per cent. more than was assumed—it would give on the gas-prover something over 2° too much, and *vice versâ*. The gas from Pelton coal analyzed by Frankland, for example, containing the low proportion of 32·9 per cent. marsh gas, would appear on the gas-prover 1° too low. Only the gases generated at a low temperature, very rich in heavy carburetted hydrogen, can contain an amount of marsh gas exceeding the assumed average, and in this case appear too highly graded on the gas-prover. The inferior gases, on the other hand, rich in hydrogen generated at a very high temperature, in so far as they contain less than 40 per cent. of marsh gas, would show by the prover somewhat too low an amount, if this error were not counterbalanced—probably overbalanced—by the circumstance mentioned above: that flames abounding in hydrogen require somewhat more air than corresponds or agrees with their contents of carburetted hydrogen.

For water gases and wood gas, which contain less marsh gas than the ordinary pit coal gases, the scale of the gas-prover must be somewhat modified, or the results they give by it must be reduced according to the average of the analyses of both kinds of gas; for by the gas-prover they would appear, in comparison with ordinary coal gas, too inferior by some degrees.

In experiments with carbonic oxide and nitrogen, in order not to leave any of the co-operating element out of consideration, I found that both are without any influence on the results. The flame of a mixture of 70 vol. nitrogen with 30 vol. olefiant gas, is very sharply defined, and is especially adapted for an exact adjustment of the height. Upon the opening of the slit, it forms a beautiful inner cone, the illuminating point of which disappears precisely at the opening of the slit to 25°. I recommend this mixture for the determination of a fixed point on the scale, and for the testing of a gas-prover to its agreement with my model.

By a series of experiments, which will be given in my larger treatise on the gas-prover, it was shown that the height of the flame is a sufficiently accurate measure of the consumption for the gas to be tested, at least for illuminating gases whose graduation lies between 30° and 50°. The differences caused by the different rapidity of the efflux of different heavy gases, will, with an apparatus of the selected dimensions, be fully counterbalanced by other circumstances, as has already been shown by the numbers given above. With gases of an unusual composition, the employment of a small meter, to determine the consumption of the gas, might be useful.

In my larger treatise, I shall give some information as to the relation of the results of the gas-prover to those of the photometer. I have not been able to pursue this subject as far as I wished, because here scientific investigation must go hand in hand with mechanics, with respect to the choice of, and alterations in, the mechanism of the burners. Several series of experiments have, however, sufficiently proved that the results of the gas-prover

* In the first portion of this article "olefiant gas" was, by an error of the translator, called "oil gas."

† *Ann. de Chem. u. Pharm.*, lxxxii. 1.

‡ Gas from Boghead coal excepted, which is not of itself very available.

§ Upon the chemical processes in the flame of illuminating gas.

‖ The analyses by Verver (*L'Eclairage au Gaz à L'Eau à Narbonne, &c.*—Liege, 1859) gives, it is true, a proportion of marsh gas of 54-57 even in *water gases*; but it can scarcely be doubted that this high proportion results from the methods employed in the analyses—namely, from the manner in which the carbonic oxide gas was determined through ammoniacal solution of chloride of copper. I have also thought it necessary to disregard Henry's earlier analyses, executed according to imperfect methods.

fully agree with the strength of the light evolved by the tested gas in a properly chosen burner. Thus a gas from Zwickau coal gave in the first, second, and third hours, the degrees of light—

18·3 : 16·9 : 12

A prover, with a narrower slit than the one now chosen, gave the proportion of these gases to one another—

62 : 56·3 : 40

Which, after the first hour from the last two, from the strength of the light, would be estimated—

62 : 57 : 40·6

Finally, I will give as examples of some gas-provings, the following:—

Dresden, on the 14th of March, 1860, determined in company with Professor Stein, and partly by him, in the laboratory of the Royal Polytechnic School—

33·3°, 34°, 34°, 34°=34°

Riesa, gas of the railway station—

43°, 42·5°, 42·5°, 42°=42·5°

Chemnitz, March 16, determined with Dr. Wunder in the laboratory of the Royal School of Arts—

32°, 32°, 32°, 31 2-3°=32°

The gas was also tested photometrically by way of comparison. In an argand burner with 32 holes, burning with an hourly consumption of 6¼ cubic feet Sax. (= 5 cubic feet Eng.), it gave, with a flame 1¾ inches high the light of 16 English normal wax candles.

Leipzig, mean of the observations from the 8th of February until the 9th of March—35°.

Mean of the observations from the 17th of March to the 18th of April—37°.

April 23—35°, 35°, 35°

27—35°, 35°, 35°

It has become evident, in manufacturing several specimens of the gas-prover, that it is impossible to give an exactly similar width to the slits in any two instruments. I have, therefore been obliged to refrain from giving a measure of the width of the slit. In order to make the scales of different apparatus agree, there must either—by means of a mixture, which admits of very precise observation, such as I have given above—be a point of the scale fixed, and the division marked out from that, or every specimen must be compared with a normal instrument, by employing the same illuminating gas, and by this means a fixed point ascertained for the scale. It is thus that the instruments agreeing with my model, which are for sale by M. Hugershoff, of Leipzig, and M. Blockmann, of Dresden, are regulated.*

FAILURE IN THE SUPPLY OF GAS AT HALIFAX.—Of late, "darkness visible" has been the lot of Halifax, both as regards the public lamps and the gas apparatus in private houses. On one occasion, the proceedings of a festive party in Zion House were abruptly brought to a close, owing to the gas going out whilst the speaker was addressing his friends. Various intimations of the failure of the supply at the gas-works occurred in other places; but on Sunday night, about ten o'clock, all were served alike, and resort had to be made to the candle indoors, the lamps, outwardly, being left to their fate. The supply had been cut off, in order that what remained might be reserved for the mills on Monday morning, when the gas, after a brief existence, fairly died out, and the workpeople had to return to their homes. Nor is this all. For several nights, the street-lamps have not been lighted, and for some time past the gas supplied to private houses and shops has been of a very inferior quality, and has thrown a gloom over many a Christmas gathering. Of course, nobody will be to blame, but the public have a right to know who are the parties who so pertinaciously persist in keeping a town like Halifax in partial, and sometimes complete, darkness.—*Halifax Guardian, Jan. 5.*

DETECTION OF BISULPHIDE OF CARBON IN COAL GAS.—A correspondent of the *Chemical News*, says that by forcing by an ordinary blow-pipe the flame of coal gas for about a minute on to distilled water, containing a little acid chloride of barium, sulphate of baryta is formed, and the presence of sulphur in the gas is thus proved.

SOUTHBOROUGH GAS-WORKS.—The following tenders have been received for the construction of these works and providing the requisite mains, according to plans and specifications prepared by Mr. Alfred Penny, London:—Messrs. G. Cutler and Co., London, for buildings

	and works . . .	£1370	0	0	
,, ,, ,,	main-pipes . . .	532	3	6	
					£1902 3 6
,, Murphy, Hythe, for works and mains complete					1760 0 0
,, Seager and Gardner, Maidstone, for buildings and works, not including mains.					1321 0 0
,, Perigal, Tonbridge Wells, do. do. . . .					1329 0 0
,, Laidlaw, Glasgow, for buildings and works		£1160	0	0	
,, ,,	main-pipes . . .	482	2	0	
					1644 2 0

The tender of Messrs. Laidlaw and Son was accepted.

REPORT ON THE GAS OF THE SURREY COMPANY.—Dr. J. Northcote Vinen, the medical officer of health for the St. Olave's district, Southwark, forwards us the following report on the Surrey Consumers gas, for the three weeks ending on Saturday, Jan. 5:—

Week ending.	Number of Observations.	Maximum Light. Candles.	Minimum Light. Candles.	Average Light. Candles.
December 22 . .	4 . . .	13·35 . .	12·61 . .	12·97
,, 29 . .	4 . . .	14·33 . .	13·78 . .	13·98
1861.—January 5 .	4 . . .	14·38 . .	10·41 . .	12·19

On Jan. 5, the illuminating power was 1¼ candle less than the parliamentary standard, but it was exceeded on the average of the week. The volume of hydrocarbons was 4 per cent.; carbonic acid, none. On Dec. 19, 21, 26, and 29, and Jan. 2, 4, and 5, there were strong indications of the presence of ammonia. The maximum pressure was 3 inches 2/10ths; the minimum, 3/10ths. The ordinary pressure varied from 6/10ths to 1 inch.

ANNUAL MEETING OF THE BILSTON GAS COMPANY.—The Annual Meeting of the Gaslight and Coke Company was held at the Bull's Head Inn, on Monday last—Mr. Robert Bew, chairman, presiding. The attendance was about as numerous as usual, and the business was entirely of a routine character. The trade account submitted by the directors, and which closed on the 29th September last, exhibited a profit of £2471. 5s. 10d. Added to this, there were £109. 1s. 2d., an unappropriated balance of last year's profits, which made a total of £2580. 7s., and this sum the directors proposed to appropriate thus:—Dividend at the rate of 8s. per share, £2000; to be added to the reserved fund, £200; bad debts, £158. 18s. 9d.; carry forward to next year's account, £221. 8s. 3d. Dividend warrants, payable on the 1st February, are to be sent to each shareholder. The report also went on to say that the large sum written off for bad debts was principally composed of an account due to the company some ten years ago; the directors had expected to realize this deficiency from some property upon which they held security, but the property only sold for sufficient to pay a prior mortgagee. During the past year, the trade had been made to bear a considerable sum in extending the mains of the company. The works having sustained some damage, the directors deemed it their duty to investigate the cause by sinking a shaft into the mines near their works; the result was that they had reason to believe the damage was the result of an encroachment into their property, in working the adjacent mines. This injury had suggested to the directors the propriety of carrying forward to next year's account a larger sum than usual, to assist in meeting any contingency that might arise. The increase of consumers during the past year was upwards of 200. The directors proposed that henceforth the dividends should be paid half-yearly—viz., 1st February and 1st August. The reserved fund was stated to be £1408. 19s., including the transfer suggested in the report. Resolutions confirming the report and the recommendations of the directors, were unanimously carried, and Mr. Bew and Mr. W. H. Bayliss re-elected directors; the other retiring director was Mr. Richard Colbourn, in the place of whom the meeting appointed Mr. Joseph Harding. The other business was the re-election of the auditor, and votes of thanks to the directors and officers of the company.

THE BRITISH COAL TRADE.—It appears that there are in England and Wales 2463 collieries, in Scotland 413, and in Ireland 73, making a total of 2949. The collieries are thus divided:—

Durham and Northumberland	142
Cumberland	28
South Durham	141
Yorkshire	383
Derbyshire	151
Nottinghamshire	23
Leicestershire	14
Warwickshire	17
North Staffordshire	127
Cheshire	35
Shropshire	59
South Staffordshire	422
North and East Lancashire	272
Lancashire, Wigan, and St. Helen's	109
Flintshire	37
Denbighshire	39
Anglesea	5
Gloucestershire	69
Somersetshire	35
Devonshire	2
Monmouthshire	74
Pembrokeshire	20
Carmarthenshire	87
Glamorganshire	181
West Lanarkshire	62
Ayrshire	91
West Stirlingshire	16
Dumbartonshire	12
Renfrewshire	9
Dumfriesshire	4
East Lanarkshire	102
Fifeshire	41
Clackmannanshire	9
Haddingtonshire	12
Edinburghshire	15
Linlithgowshire	18
East Stirlingshire	20
Peeblesshire	1
Perthshire	1

The quantity of coal and coke carried into the metropolis for the year ending Jan. 1, shows an enormous increase on preceding years. No less than 1,477,545 tons, 16 cwts. have been conveyed from various parts of England to London, by the railways having access thereto, the London and North-Western and the Great Northern carrying the vast proportion. The following is the actual tonnage of each railway company:—The London and North-Western, 693,418 tons, 16 cwt.; Great Northern, 502,813 tons, 14 cwt.; Eastern Counties, 121,225 tons, 16 cwt.; Great Western, 63,944 tons; Midland 58,490 tons; South-Western, 17,589 tons, 6 cwt.; South-Eastern, 14,585 tons, 8 cwt.; Hertford, Luton, and Dunstable, 4416 tons, 19 cwt.; London, Tilbury, and Southend, 958 tons; and the London and Brighton, 104 tons. Of this aggregate 1/9th has been produced from the Clay Cross pits, near Chesterfield. For the year, the seaborne importation has been 3,573,377 tons, brought by 11,226 ships, against 3,299,170 tons by 10,693 ships, being an increase of 274,207 tons and 533 ships.

THE SCOTCH PIG-IRON TRADE.—This important trade has remained in a state of comparative sluggishness during the past year, and stocks have accumulated to the extent of 97,000 tons. Nevertheless, an immense business has been done, 903,000 tons having been taken into consumption. The state of the trade during the last fifteen years is shown in the following table:—

Year.	Make Tons.	Consumption. Tons.	Stock. Tons.
1845 . . .	475,000 . .	390,000 . .	245,000
1846 . . .	570,000 . .	666,000 . .	149,000
1847 . . .	510,000 . .	579,000 . .	80,000
1848 . . .	580,000 . .	562,000 . .	98,000
1849 . . .	690,000 . .	578,000 . .	210,000
1850 . . .	595,000 . .	535,000 . .	270,000
1851 . . .	760,000 . .	680,000 . .	350,000
1852 . . .	775,000 . .	675,000 . .	450,000
1853 . . .	710,000 . .	950,000 . .	210,000
1854 . . .	770,000 . .	860,000 . .	120,000
1855 . . .	825,000 . .	847,000 . .	98,000
1856 . . .	832,000 . .	842,000 . .	88,000
1857 . . .	915,000 . .	843,000 . .	160,000
1858 . . .	945,000 . .	810,000 . .	295,000
1859 . . .	950,000 . .	915,000 . .	330,000
1860 . . .	1,000,000 . .	903,000 . .	427,000

At the close of last year, the number of furnaces in blast was 131 (44 were out of blast), as compared with 125 in 1859, 132 in 1858, 123 in 1857, 128 in 1856, 121 in 1855, 117 in 1854, 114 in 1853, 113 in 1852, 112 in 1851, 105

* Similar instruments may shortly be procured from the house of Alexander Wright, 55, Millbank Street, London.

in 1850, 112 in 1849, 103 in 1848, 100 in 1847, 98 in 1846, and 88 in 1845. Of the 427,000 tons at present estimated to be in stock, 164,000 tons are in warehouse-keepers stores, and 263,000 tons in the hands of makers. The exports, foreign and coastwise, last year, were 563,000 tons; and 340,000 tons were consumed in local foundries and malleable iron-works, and sent by railway. The malleable iron-works consumed 170,000 last year as compared with 150,000 tons in 1859; and the foundries 185,000 tons as compared with 190,000 tons in 1850, the orders last year having been principally for light goods. France last year took 50,013 tons as compared with 51,345 tons in 1859; Germany and Holland, 69,469 tons as compared with 63,215 tons in 1859; Russia, 3925 tons as compared with 5669 tons in 1859; Spain and Portugal, 9934 tons as compared with 8629 tons in 1859; the United States, 77,632 tons as compared with 85,187 tons in 1859; British America, 15,255 tons as compared with 10,777 tons in 1859; and Italy, 15,255 tons as compared with 10,470 tons in 1859. The growth of the trade may be strikingly illustrated by the fact that, while the production last year was 1,000,000 tons, in 1839 it was only 197,000 tons; in 1825, 29,200 tons; and in 1805, 9000 tons.

MAIN DRAINAGE WORKS.—Mr. Bazalgette, the engineer to the Metropolitan Board of Works, has drawn up a report on the progress of the main drainage works on the north and south sides of the Thames, of which the following is an abstract:—The bulk of the main drainage works has of necessity been stopped for a considerable portion of the past month on account of the frost. The northern high-level sewer works will probably be recommenced and rapidly finished off as soon as the weather permits. The middle-level sewer, which has been re-let to Messrs. Thomas Brassey and Co., also awaits a change in the weather. The arrangements for placing Mr. Furness in possession of the land along the whole line of the northern outfall sewer are now nearly completed, and this work will be commenced in the course of the present month. The Ranelagh storm overflow sewer, across Hyde Park, progresses satisfactorily, works to the amount of £5700 having been completed, in addition to the underpinning of the old sewer to the value of £2688. On the south side of the river, the southern high-level sewer is now in progress at five different points, three on the main line and two on the Dulwich or Effra branch. The value of the work done is about £5800, and the total length completed is 3 miles, 1820 feet. The southern outfall sewer continues to be carried on in a very business-like and satisfactory manner. The tunnel under Woolwich is about one mile in length, and varies from 45 to 75 feet in depth; four shafts have been sunk, and 2253 feet of tunnel completed, the headings being lighted with gas, and the miners working day and night; the tunnel will probably be completed next autumn. The rest of the work is, with trifling exceptions, being constructed in open cutting, and about 6527 feet have been completed, making 8510 feet in tunnel and open cutting. The value of the work done is about £80,000. The works for the low-level sewer under the Surrey Consumers Gas Company's property, contracted for by Mr. John Aird, now progress satisfactorily; the water having been subdued, the excavations are nearly completed. The Earl outlet was in a very dilapidated condition; it is now being reconstructed, and the sewerage conveyed through pipes to low water, and this will form a storm overflow in connexion with the low-level sewer.

Price Current.

CASTINGS, PER TON.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 5 0	2 12 6	2 12 6	3 0 0	3 5 0
1¼ and 2 inches Socket-Pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3 ,, ,,	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
4 and 5 ,, ,,	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 in. and upwards ,,	5 15 0	4 15 0	5 0 0	5 5 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
,, 2nd ,, cold ,,	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank Plates, ¼ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 ft., perft.	1 8	1 0	0 10	0 7	0 5	0 4½
,, ,, ,, 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-Pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows—wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
,, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Plain Sockets [Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	—

COALS, PER TON.

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 9d.	Boghead, at Leith	45s. 0d.
Medomsley, Eighton Moor, and Burnhope	7 0	Kirkness, best	23 0
Pelaw	7 3	Capeldrae, 1st quality	20 0
New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth	7 6	,, 2nd ,,	12 6
Pelton	7 9	Lesmahago, at Glasgow	25 0
Ramsay's Newcastle Cannel	16 0	,, ,, Leith	27 6
		Arniston	27 6
		Wemyss	20 0
		Knightswood	18 0
		Pirnie	15 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham & Rochester	8s. 1½d	Boulogne and Calais	£10 0 0
Cork	12 6	Barcelona	24 0 0
Dover	8 6	Bordeaux	15 0 0
Dublin	13 6	Cadiz	15 0 0
Exeter Quay	11 0	Copenhagen	11 0 0
Folkestone	8 6	Dieppe	12 0 0
London (Pool)	8 1¼	Genoa	22 0 0
Lowestoft & Yarmouth	6 6	Hamburg	13 0 0
Lynn	—	Havre	13 0 0
Portsmouth	9 6	Leghorn	22 0 0
Plymouth	10 6	Lisbon	17 0 0
Ramsgate & Margate	8 6	Rotterdam	12 0 0
Whitstable	8 0	Stettin	10 0 0
Weymouth	10 0	Trieste & Venice	23 0 0

SUNDRIES.

Best Newcastle Fire-bricks	per 1000	50s. 0d.	
Cliff's Fire-bricks, at Wortley	per 1000	55 6	
Ingham's Fire-bricks, at Wortley	,,	55 0	
Fire-clay Retorts	per foot run,	5s. 6d. to	7 0
Tough Cake Copper ... per ton	£102 10s.	Foreign Spelter ... per ton	£18 5 0
English Pig Lead ... ,,	21 10	English Block Tin ... ,,	132 0 0
Welch Bar Iron, in London ,,	7 0 0	Banca ... ,,	134 0 0
Tarred Rope Yarn	per cwt.	26s. 0d.	

Advertisements.

JOSEPH CLIFF and SON,
FIRE-CLAY WORKS,
WEST DENTON, NEWCASTLE-ON-TYNE,
Manufacturers of Clay Retorts, Fire-Bricks, Lumps, Tiles, &c.

The seam of Clay from which these goods are made is noted for its fire-resisting properties. Prices very moderate.

Office, 52, Quay Side, Newcastle-on-Tyne.

GEORGE BOWER,
GAS ENGINEER, MANUFACTURER, AND CONTRACTOR,
ST. NEOT'S, HUNTS.

References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

EIGHTON MOOR GAS COALS.—Parties wishing to be supplied with these first-class Gas Coals will please to apply to Mr. MATTHEW NESBIT, EIGHTON MOOR OFFICE, NEWCASTLE-UPON-TYNE. These coals are well known as among the richest in gas, and working the roundest on the River Tyne. They are extensively used by metropolitan gas works.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

SAMUEL CUTLER, Gasholder
MAKER and CONTRACTOR

For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.

PROVIDENCE IRON WORKS,
MILL WALL, POPLAR, LONDON, E.
Main Laying and Gas-Works erected complete.

THE Provanhall Coal Company beg to intimate that they are prepared to ship their Cannel Coal at Glasgow, Grangemouth, or Leith, and to deliver the same at places having communication by Railway.

Analyses by Professor Penny, and Certificates from Parties using the Coal, will be forwarded, and terms learned on application at their Office, 20, Jackson Street, GLASGOW.

TO MAIN LAYERS.

WANTED, by the Cheltenham Gas COMPANY, an experienced MAIN and SERVICE LAYER. To a man of ability and steady habits, good encouragement will be given.

Applications, accompanied by Testimonials of character and qualifications from past and present employers, to be made to W. ESSON, Engineer.

Cheltenham, Dec. 13, 1860.

WEST and GREGSON, Gas-Meter MANUFACTURERS, &c.
UNION STREET, OLDHAM.

Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Boringa.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street, LONDON.

TO GAS COMPANIES.

STOKERS' GLOVES,
11s. per Dozen.
S. CARPENTER, 3, BOW COMMON.

THOMAS W. ALLSOPP,
GAS ENGINEER AND CONTRACTOR.
CASTLE DONINGTON, NEAR DERBY,
Manufacturer of every description of Gas Apparatus, Gasholders, Boilers, &c.

GEORGE CUTLER & CO.,
GAS ENGINEERS, &c.,
London Gasholder and Boiler Works,
8, WHARF, WENLOCK ROAD, CITY ROAD, N.,
LONDON.

Rye, Nov. 12, 1860.

Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.

I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent,
Rye Gas-Works.

Messrs. Cutler and Co.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,
MANUFACTURERS OF EVERY DESCRIPTION OF
FIRE BRICKS, CLAY RETORTS, LUMPS, TILES, &c. &c.

LONDON OFFICES:
76, KING WILLIAM STREET, CITY.

A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

PERRENS & HARRISON,

THE LYE FIRE-CLAY AND BRICK-WORKS, STOURBRIDGE,

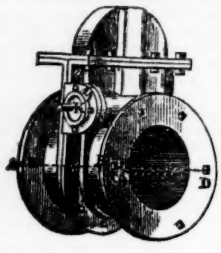
Successors to the late firm of J. and W. KING,

and Sole Proprietors of their well-known CLAY MINES, are prepared to supply

GAS-RETORTS, CLIFT'S PATENT GAS-OVENS and FIRE-BRICKS

OF ALL DESCRIPTIONS,

the superior quality of which will, they are confident, secure them further orders.



BRYAN DONKIN & CO.

keep always on stock their

IMPROVED GAS VALVES

from 2 inches to 18 inches, price 11s. 6d. to 13s. 6d. per inch diameter

List of prices, with full dimensions of all sizes up to 27 inches, to be had on application.

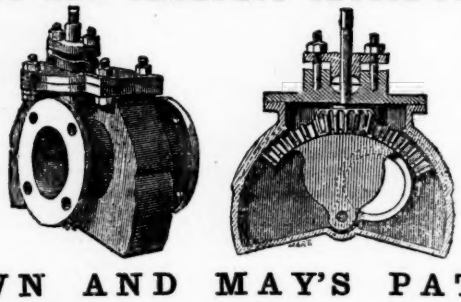
These Valves are all proved to 30 lbs. on the square inch before leaving the works.

BRYAN DONKIN & CO.,

ENGINEERS,

NEAR GRANGE ROAD, BERMONDSEY.

BEST AND CHEAPEST SLUICE-COCK.



BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

Can be taken to pieces without being removed from the line of Piping.

NORTH WILTS FOUNDRY, DEVIZES.

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C., Where a Sample may be seen.

WALTER FORD,

LATE

PADDON and FORD,

GAS-METER AND APPARATUS WORKS,

GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS,** up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

JOSEPH BOULTON,

28, BAGNIGGE WELLS ROAD, CLERKENWELL,

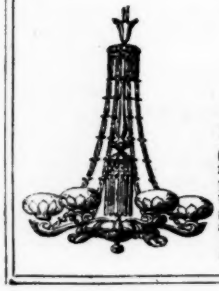
PATENTEE OF

DRY & IMPROVED WET GAS-METERS,

AND

GAS APPARATUS.

All Meters warranted to comply with the Act of Parliament.



F. & C. OSLER,

45, OXFORD STREET, LONDON;

Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards

(Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,

DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, MR. E. M. PERKINS, 78, Lombard Street.

JOHN ROGERSON and CO.,

NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

LONDON HOUSE:

12, ROYAL EXCHANGE BUILDINGS.

WROUGHT-IRON Guides for Gas.

HOLDERS, when Trussed upon scientific principles, are more capable of resisting strains, in every direction, than Cast Columns of any form can be; and weigh only one-fifth as much as the latter. Designs and Working Drawings for Guides and Ties can be obtained of the Inventor, CHARLES DIXON, C.E., Chichester, SUSSEX.

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BEAL, WALKER, and CO., Coal and

COKE MERCHANTS, No. 1, Walker's Buildings, SHEFFIELD, beg to inform the Directors and Managers of Gas Companies, that they are in a position to contract for the supply of the different sorts of best Gas Coal, such as best Silkstone, Barnsley, and others, at the lowest prices, which may be had on application at the above Office.

ALFRED PENNY, Gas and

CONSULTING ENGINEER,

WENLOCK IRON WORKS,

21 & 22, WHARF ROAD, CITY ROAD, LONDON.

MR. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.

Plans, Specifications, and Estimates prepared.

JOSEPH WILLCOCK

(late BARLOW and CO.),

Mechanical and Architectural Draftsman, Designer, Surveyor, an Lithographer to Gas Engineers and Gas Apparatus Manufacturers, formerly Superintending Engineer at the largest Gas Apparatus Manufactory on the Continent.

Patent and Designs Office, 89, Chancery Lane, LONDON, W.C.

GEORGE ANDERSON, Gas and

CONSULTING ENGINEER,

104, LEADENHALL STREET, LONDON (E.C.).

DIRECT-ACTING GAS-EXHAUSTERS,

supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES,

one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS,

designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

BENJAMIN GIBBONS, Jun.,

DEEPDALE FIRE-CLAY & BRICK WORKS,

Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,

TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

WILLIAM BLEWS AND SONS'
IMPROVED MACHINE-MADE BURNERS,
WROUGHT-IRON BATSWINGS,
FOR RAILWAY STATIONS AND MARKETS,
GAS-FITTINGS, CHANDELIERS,
BRASS AND IRON TUBES OF EVERY KIND,
SUPPLIED ON THE BEST TERMS,
AT THE WORKS,
9, 10, 11, BARTHOLOMEW STREET,
BIRMINGHAM.

JAMES NEWTON,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANT,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON.
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and CLAY, and every Article suitable for
GAS AND WATER WORKS.

CAUTION.
TO GAS-METER MANUFACTURERS AND OTHERS.
THE Undersigned hereby caution Meter Manufacturers and others against infringing the exclusive right of the Undersigned to the use of the Screw Adjustment for regulating the Height of the Overflow-Pipes in Wet Gas-Meters, as described in the Specification of the Letters Patent granted to Crosley and Goldsmith on the 19th of April, 1856; as well as against infringing any other portions of that or any other Patent of the said William Crosley; and
NOTICE is further given, that all Infringers of the said Inventions, or any portions of them, will be proceeded against. CROSLEY & CO.,
103, SOUTHWARK BRIDGE ROAD,
LONDON, Aug. 29, 1859.

Gas Stoves, Gas Baths, Gas Cooking APPARATUS, warranted the best in England, at PHILLIPS's, the original inventor and manufacturer, and general gas-fitter, &c., 55, Skinner Street, Snow Hill, LONDON, E.C.
PATENT SAFETY ATLAS CHANDELIERS, Sun and Star Burners, Outside Lamps, Patent Reflecting Lamps, Portable Coppers for either Gas or Fuel. Iron Tube and Fittings. Best quality for Gas, Steam, or Hot Water, &c. &c.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.
NB. A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches. 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

TO GAS COMPANIES AND CONTRACTORS.
FOR Sale, several lengths of Hydraulic MAIN, 14 inches diameter and 6 feet 9 inches long, with 7 holes for DIP-PIPES.
Also 4-inch ASCENSION-PIPES, and 3-inch ARCH and DIP-PIPES, and RETORT MOUTHPIECES, all in excellent condition, and will be sold at a very low price, and delivered, if required, at any Railway Station in London.
To be seen, on application to the ENGINEER, at the Equitable Gas Company's Works, Lupus Street, PIMLICO.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,
GLOBE PATENT TUBE WORKS,
WEDNESBURY,
Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.
Orders promptly executed.

TO Mr. BENJAMIN WHITEHOUSE,
GASHOLDER MAKER,
WESTBROMWICH, NEAR BIRMINGHAM.
Sir,—I feel great pleasure in expressing my satisfaction at the manner in which you discharged your duties as CONTRACTOR for the TELESCOPIC GASHOLDER, 150 feet diameter and 60 feet deep, erected at this Company's Nine Elm Station in 1857. From that period to the present I have closely watched its working, and have never found the least defect either in workmanship or material.
During the recent heavy gales the Gasholder, although containing upwards of 1,000,000 cubic feet of Gas, showed no perceptible indications of its influence, but worked as freely and easily as usual.
RICHARD JONES,
Engineer to the London Gaslight Company.
Vauxhall, London, Nov. 9, 1859.

BELGIAN CLAY RETORTS.
ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Albert Keller, of Ghent, begs to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by him. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications, addressed to ALBERT KELLER, GHENT, will receive immediate attention.

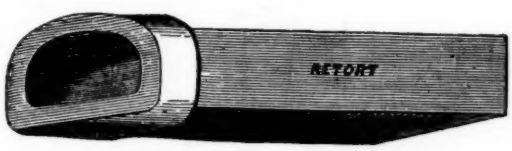
FLEXIBLE GAS TUBING,
VULCANIZED INDIARUBBER HOSE-PIPES,
WASHERS FOR STEAM-JOINTS, &c.
JAMES LYNE HANCOCK begs to inform the trade he has considerably improved the manufacture of his FLEXIBLE TUBING, both PLAIN and GLAZED. Made all sizes in 60 feet lengths.
INDIARUBBER GAS BAGS, fitted complete with Stop-Cocks and Tubes.
All orders to be addressed to JAMES LYNE HANCOCK, Vulcanized Indiarubber Works, Goswell Road, (opposite Spencer Street) LONDON (E.C.).

STOURBRIDGE FIRE-CLAY WORKS.
E. BAKER and CO.
(Contractors to Government).
24 WHARF, HARROW ROAD, PADDINGTON, W,
Every article manufactured at their own Works and Mines, Brierley Hill.
FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.
CRUCIBLE and CEMENT CLAYS.
GARDEN EDGINGS, of various patterns.
BUFF and ORNAMENTAL TILES.
CLINKERS and STABLE PAVINGS, noted for hardness and durability, being perfectly non-absorbent.
Shipments on the shortest notice.

WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET
MANCHESTER,
Manufacturer of
IRON TANKS for Gasholders, Railway Stations, &c.
GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.
GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.
WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.
IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.
PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

WOLVERHAMPTON RETORT WORKS.
ESTABLISHED **1840.**
JOHN EUNSON AND SON,
GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,
AND FIRE GOODS IN GENERAL,
WOLVERHAMPTON.
Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

KING BROTHERS,
STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.
Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.
Every Retort and Brick is branded "King Brothers, Stourbridge."

WILLIAM SUGG,
MANUFACTURER OF
PATENT DRY AND WATER GAS-METERS, TEST GASHOLDERS, AND APPARATUS,
"EVANS'S" PHOTOMETERS,
Experimental Meters, Minute Clocks, &c., Station Meters and Governors,
STREET-LAMP GOVERNORS AND LAVA BURNERS,
19 and 20, MARSHAM STREET, WESTMINSTER.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of
RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,
beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

WILLIAM PARKINSON AND CO.,

(SUCCESSORS TO THE LATE SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

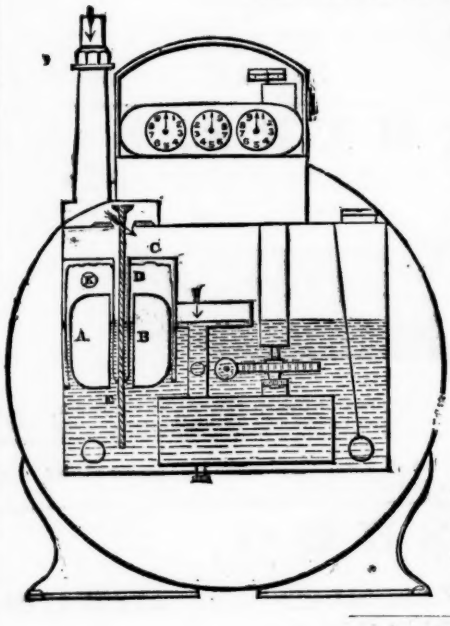
PATENTEES AND MANUFACTURERS OF

STATION-METERS & GOVERNORS,

CONSUMERS' METERS & GOVERNORS,

AND OTHER GAS APPARATUS. Also,

METERS FOR MEASURING WATER.



IMPROVED LOW-SPOUTED GAS-METER,

WITH

NEW PATENT FLOAT ARRANGEMENT.

The Float A is partitioned off from the front frame considerably below the water-line, and is pierced perpendicularly by a tube B.

A large gas-way, C, is left between the top of the partition and the valve-seat. The small tube D, in which the float-wire works, is fixed to the top of the partition, and comes down below the water-line inside the tube B. The float-wire is soldered to the float at E, so as to allow water to pass into the tube D, in order to seal it. The chamber above the float is open to the outlet through the hole K.

The action of this float is exactly opposite to that of ordinary meters. The float is elevated by sudden pressure, and the valve cannot be closed except through want of water.

W. P. and Co. beg especially to call the attention of Gas Companies and others to this New Patent Meter, which entirely overcomes the difficulty experienced by ordinary wet meters, owing to the short range of the float, which is necessary in order to meet the requirements of the "Sale of Gas Act."

They are prepared to supply

TEST GASHOLDERS,

of the most approved description, graduated by the Standard.

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON, S.E.

N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c., &c., similar to those used by Mr. King, of Liverpool.

CROSLEY & CO. are also prepared to supply Gas Companies and others with

DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,

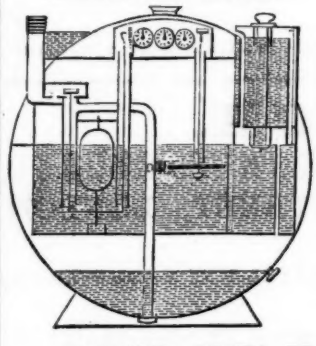
similar to that manufactured by them, and verified by the ASTRONOMER ROYAL, and PROFESSOR MILLER, of Cambridge, on behalf of the Government, which was deposited by C. & Co. in the Office of the COMPTROLLER-GENERAL of the EXCHEQUER before Nov. 13, 1859, in compliance with the "Act for Regulating Measures used in Sales of Gas." They also supply

TEST GASHOLDERS,

Graduated by the Standard Cubic Foot.

C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.

PATENT WET METER.



N. DEFRIES,

CONSULTING GAS ENGINEER,

Inventor and Patentee

OF

WET GAS-METERS,

WITH SELF-ADJUSTING WATER-LINE;

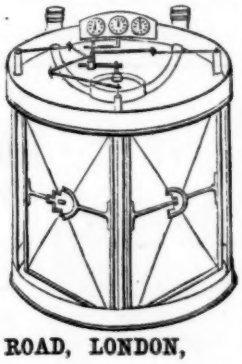
DRY METERS,

GAS-HEATING BATHS, OVENS, STOVES,

GAS FIRES with INDESTRUCTIBLE FUEL,

&c., &c.

PATENT DRY METER.



FACTORY: DIANA PLACE, FITZROY SQUARE. OFFICE: 406, EUSTON ROAD, LONDON,
Eight Doors from Factory.

Attempts having been made to construct Self-Supplying Apparatus to Wet Gas-Meters upon the Bird Fountain principle,—which, although unerring to supply water in the open atmosphere, has not wholly succeeded so as to be relied upon when enclosed in a Gas-tight Meter Case,—N. DEFRIES begs leave most respectfully to acquaint Gas Companies, and the Public in general, that he has constructed his PATENT WET GAS-METER upon a method entirely different, being founded on the well-known principle of the self-acting supply of the Oil Lamp, which has never been applied for the adjustment of the Meter Water-Line before, and which, by the admission of external air to a chamber sealed from Gas, will never fail to faithfully perform its required function. They are of the very best materials and workmanship, will stand more pressure than is required as the test for soundness by the New Act, are guaranteed to prevent surreptitious burning without detection, and will be kept in repair free of charge for seven years.

N. DEFRIES'S CELEBRATED DRY METERS,

of which more than 80,000 are in use in Palaces, Churches, Chapels, Royal Dockyards, Club Houses, Public Offices, and other Buildings throughout the Empire and Continent, which have done so much in checking surreptitious burning, and simplified the fitting up of Gas.

To remove any doubt of accuracy of measurement his Meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that Building was destroyed by Fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company in the presence of George Lowe, Esq., F.R.S., and other Chief Officers, and found inflexibly correct. Also, on the 9th of June, 1858, at the Western Gas-Works, his Meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests—from the full lighting to a single Jet—and in each case, as in other instances, accuracy was finely indicated.

As to durability, his two large Meters at the Thames Tunnel have been in use night and day for upwards of twelve years—one continuation of dark hours—subjected to the wear and tear of seventy-five years as compared with the ordinary business hours of using Gas above ground.

LORD REDESDALE'S SALE OF GAS BILL.

All Meters constructed by N. DEFRIES are guaranteed to pass the Provisions of the Standard.

No alteration has been necessary in the Meters he continues to supply to the Chartered, Imperial, City of London, Equitable, and other large Companies, his accustomed range of 1 per cent. over and under meeting all the desired requirements; whereas, by the New Act, a greater departure from accuracy—viz., 2 per cent. fast to 3 per cent. slow—is permitted.

SALE OF GAS ACT.

MESSRS. CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

Also Manufacture and Supply

TEST GAS-HOLDERS,

And other Apparatus required by the Inspectors appointed in pursuance of the above Act.

Application for particulars to be made to the Factory,

CANAL BRIDGE, KINGSLAND ROAD, LONDON, N.E.

ALEXANDER WRIGHT,

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"Analysis of Gas for Practical Men," by A. WRIGHT, M. Inst. C.E., post-free for 13 Stamps. PRICE-LISTS ON APPLICATION.

JAMES MEACOCK,

PATENT DRY AND WET GAS-METER MANUFACTURER,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

ESTABLISHED 1836.

J. M. invites attention to his Improvements in EXPERIMENTAL WET GAS-METERS, by which he renders impossible any Leakage from the Stuffing-Box.

These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,

EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,

AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE, BLACK & GALVANIZED. COPPER. TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—60s. net.

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Sole Manufacturers of Church and Mann's Photometer.

Large Pattern Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

London: Printed by WILLIAM BOUGHTON KING (at the office of Joseph Clayton, 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, January 15, 1861.